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Contents for March, 1937

Volume 9, Number 3

FOOD INDUSTRIES

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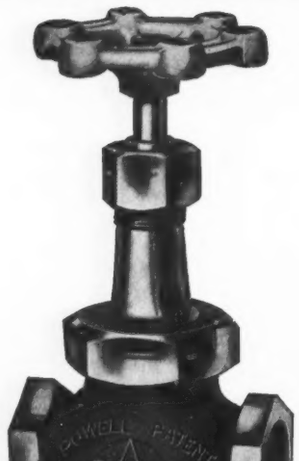

FIG. 102
BRONZE WHITE STAR GLOBE VALVE

FIG. 150
BRONZE COMPOSITION DISC
GLOBE VALVE

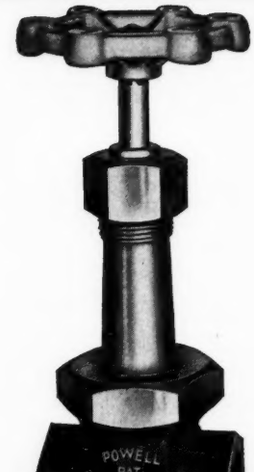

FIG. 375
BRONZE WHITE STAR GATE VALVE

FIG. 1444
IRON BODY RISING
STEM GATE VALVE

FIG. 190
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FIG. 1431
IRON BODY NON-RISING
STEM GATE VALVE

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FOOD INDUSTRIES

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Lawrence V. Burton, Editor

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MARCH 1937

The Talk of the Industry

»TO SEPARATE THE FACTS in the news from the applesauce or plain unalloyed bunk is one of the tasks of this department. We have never flown, let alone eaten, in an airship, so when the following tale blew into our office alleging to be the authentic findings of the Aeronautical Institute of Berlin University—if there is such an institute—we are forced to depend on commonsense and suspect it to be eyewash.

"Coffee," the story says, "loses its taste at a height of 3,000 ft. unless the grounds are left in the container. The taste goes even when it is in a vacuum flask." If this were true, think of the impossibility of selling coffee in the mountainous parts of the United States. In fact we have drunk coffee at 15,000 ft. and did not miss the flavor.

"At a height of 6,000 ft. tongue sausage turned hard and leathery and almost completely black in appearance. At 9,000 ft. cauliflower lost its color. . . . So far, the Aeronautical investigations have failed to discover the reason."

Clever boys at the institute.

» "NO ONE CAN BE SURE" seems to apply aptly to the unexpectedness of the President's intention to make all Supreme Court decisions come out the way he wants them.

Perhaps he will be able to achieve his own purposes, and pack the Supreme Court. If we do not like it, we can console ourselves by saying that the American people get as good government as they deserve.

Right now it looks, however, as if Mr. Roosevelt might be trying to impress the followers of Mr. John L. Lewis. Mr. Lewis has shown the United States that he is apparently above the law. If Mr. Roosevelt should now demonstrate that he is above the courts, that he can make them follow his will, then perhaps the C.I.O. unions may be sufficiently impressed to accept Mr. Roosevelt's judgment and follow it. Yet if such a conjecture prove to be correct, it would still leave Mr. Lewis as Problem Child No. 1 of the present Administration.

Or perchance, this Supreme Court affair may be a characteristically adroit move to divert attention from the General Motors strike. "No one can be sure."

»BELIEVE IT OR NOT, the latest "advance" in food technology seems to be the production of a beverage called Fire Beer. A Detroit brewery is putting out some curious literature extolling the merits of its Fire Beer in extravagant language. Beer, says the company, is a cooked food and to cook anything properly it must be cooked over a fire. So they build a fire directly under the brew kettles and abandon the use of steam jackets and coils. One wonders just what

methods they employ to control the boiling. And suppose the kettle should boil over?

»BITS OF GOSSIP around the trade indicate that big chain stores are complying with the Robinson-Patman law very successfully. It is reported that one of them has signed eighteen contracts for the entire output of certain plants. One of these is said to be a joint contract with another chain to take all the output of a certain sugar refinery. Another such contract is said to be between two large chains and a soap factory for all its output. Looks like some low cost merchandise for private brands.

»ONE OF THE BITS OF NEWS is the recent statement of Congressman Wright N. Patman that he is going to see to it that the Federal Trade Commission is properly financed to enforce the Robinson-Patman law. That ought to help a lot and please everybody.

Get Into Politics

IF THE SIGNS OF THE TIME mean anything, they mean that business men have an urgent need to get into politics. Most of us have been so tied down to our jobs that we have left all political leadership to whomever wanted it. And today we are paying the penalty for pursuing the almighty dollar to the exclusion of all else.

Activity of business men in politics is something that will work both ways. The electorate will be exposed to the thinking and leadership of men who understand the complexities of business. And the business men will be exposed to the thinking and desires of the electorate. The mutual effect cannot fail to be good for everybody.

And, mark this well: the few businesses in this country headed by men who have been active in politics are enterprises that have not only been successful but have been singularly free from labor problems. Politics is the art of government—not merely the art of winning elections.

The fundamentals of good political leadership do not evaporate just because men step into a factory. Management has given economic leadership to its employees. Every enterprise employs many persons who could not get anywhere in the present business world without the leadership of management. But now it appears that economic leadership is not enough. It must be combined with political leadership—not only for the benefit of the employees but also for the educational value that such activity will have on management.

There are serious problems ahead. Economic judgment alone will not suffice to cope with them. Management is too often given to considering the employee in economic terms—such as production per man-hour. Employees don't think that way. They never regard themselves as economic units. They are people. They have lives, families, worries, problems as complicated and as difficult for themselves to solve as are the greater problems of the more able men who have the bigger responsibilities.

To begin to have this political insight requires that management first must become thoroughly acquainted with its own men. That will be the hardest job. The rest will be easy in comparison.

Hors d'Oeuvres

• Let there be no more weaklings. "Zoomo", a special chocolate drink is on the market. The label explains the product. It pictures a robust giant of a man, clad in loincloth, standing astride a reclining feminine form dressed in long tresses. The label reads: "Zoomo power never shirks.—Have a can and shoot the works." Who makes Zoomo? Sorry, there is no name on the label.

• *If the daily press has it right, German bakers are not permitted to sell bread that is not more than a day old, the idea being to make the short wheat crop go further. Crazy? Well, didn't someone say that Hitler thought he was Napoleon.*

• Geo. A. Hormel & Co. is posting on an "opportunity board" notices of vacancies arising from resignations and such. As though every good job isn't a buzzards' roost over which ambitious men hover while waiting for the incumbent to fall by the wayside and leave a vacancy.

• *How can you put sex appeal into your product? Well, how do you put sex appeal into a dress? By putting an attractive girl in it. But you say, foods are to eat, not wear. Quite so. But don't jump at conclusions. A St. Louis manufacturer made a costume of macaroni, complete with "grass" skirt, brassiere, bracelets and whatnot. This won a prize at a charity ball and got into the papers. So you see, even macaroni can have the old S.A.*

• You can either believe it or ask your great grandfather, but a shortage of beer bottles once halted the American brewing industry. In 1790, quart bottles of black glass were so scarce that Congress appropriated $8,000 to rebuild a glass factory destroyed by fire. Oh, to have been a can manufacturer in them days!

• *Here's a slogan for canners, preservers and other processors of almost-ready-to-eat foods: "If your wife can't cook, don't leave her. Keep her for a pet and eat our groceries."*

• A circular on raspberry culture has been issued by New York Agricultural Experiment Station. This is pretty complete, but it fails to mention that the most juicy of all varieties of the raspberry thrives in the Bronx.

• *Children do not say "to hell with it" when confronted with spinach. On the contrary, it is one of their favorite foods, as indicated by the findings of Childrens' Welfare Federation, New York. But children, and adults, too, say to hell with anything that is good for them but that they don't like. So the New Yorker was figuratively right, after all.*

• A book recently published in Germany blames sabotage by the Jews with decreasing pig numbers in the Reich from 25,000,000 in 1914 to 9,500,000 in 1918, thus causing Germany to break down under the Allied blockade. So America didn't really win the War, the dead pigs did.

A Dangerous Precedent

EVERY THOUGHTFUL PERSON has been disturbed by the failure of law enforcement in Michigan. Irrespective of the merits of the controversy, it is a very dangerous precedent to permit either those who defy the law or those who sought the job of enforcing it to ignore court orders.

Either there is law and order or there is none. There is no twilight zone. Breakdown of respect for law and the courts can easily become so complete that nothing short of a ghastly massacre will be able to restore order.

By the very nature of things the sit-downers cannot advance their cause by defiance of the court, nor is it likely that they will lose whatever rights may be theirs by obedience.

Our Part in the International Situation

STRAWS IN THE WIND OF EVENTS direct one's attention to the international political situation and give pause to any one whose thinking extends beyond the immediate confines of his job or his business. Certain British industries are working under "unlimited orders" to produce all the munitions possible regardless of cost.

Buyers from other European nations have combed the United States for used machine tools. The market is bare. The machine tool industry here cannot make deliveries on new orders for equipment in less than 12 to 24 months.

The economic situation in Germany is growing desperate. Private communications from reliable sources indicate that something must be done; that the pressure of popular opinion will force Hitler to act. And the lesson of history indicates that he will act in the traditional manner—fight. With whom, against what, for what objective is immaterial if it diverts German opinion from its economic troubles and insures Hitler his job.

A request that FOOD INDUSTRIES summarize what the United States could do to feed Britain in case of a war has come to us. Germany is short of food by millions of tons. Göring's plea is "Guns instead of Butter." One of the great industrialists of England recently said in our own offices—"Come what may, let nothing ever prevent the English speaking peoples from standing together."

Granting that most of the troubles abroad arise from the impact of communism against fascism, and also granting the truth of the British theory that communism cannot be fought with bayonets, there remains a much larger principle that will probably determine the outcome. Emotion will ultimately dominate reason in any nation. And however peaceful a country may wish to be, it will defend itself if it is attacked.

If a general outbreak occurs abroad, the American food manufacturer will be called upon to perform miracles. Readers with long memories can recall the problems of purchasing equipment and supplies about 22 years ago. It is to be hoped that no need for it arises, but it is time for each company to study itself and its place in the scheme of things—just in case—even if neutrality legislation seems to indicate its futility.

Mechanization of Wholesalers A Factor in Distribution

WHOLESALE GROCERS, once thought to be on the way out, are coming back. Their cost of doing business was too high and the more efficient chains took a fearful toll.

Today they are mechanizing their office routine and their warehouses. By the use of material handling equipment of the most modern design their warehouses are models of speed and efficiency. The cost of handling an order has been cut almost in half —sometimes more than half by the use of more business office machinery.

If wholesalers can compete with corporate chains on costs, then independent retailers can more easily compete on price.

Universal Newsreel, from Globe

FOOD AND THE FLOOD

This scene at Paducah, Ky., shows one of the tricks which swirling flood waters of the Ohio played on food manufacturers and distributors. Plants, trucks, warehouses and retail outlets were rendered hors de combat in the worst flood the Midwest has experienced. Rehabilitation, now under way, will be a costly procedure.

Keeping Right on Soy Beans

THERE is considerable danger that over enthusiastic friends of the soy bean may attempt to develop the new industry into directions that are unwise and may retard its development. Properly exploited, the soy bean should add to our national welfare; but improperly exploited the soy bean may go into disfavor. It has not yet won its way to the point where Americans will recognize its possible misuse, despite the propaganda of the Farm Chemurgic Council at Dearborn, Mich.

Oriental foods such as soy bean milk and cheese are not very palatable, we are advised, and are more expensive than cows' milk and cheese. Until there is a shortage of cows' milk it is unwise to create fears of new competition and the consequent antagonism of the dairy crowd.

Another possible weak spot lies in the marketing of inferior tasting soy bean products, yet putting them over by a sales talk on nutritive values. Any food that earns a permanent place on the American dinner table does so because it tastes good—not because it ought to be eaten.

Again: emphasizing the value of soy beans as a food for diabetics lays stress on one of its lesser values. To most of us, diabetic foods seem like foods that have been deprived of all pleasure and zest in eating. Butter, green vegetables and poultry are good foods for diabetics, but a big sales drive on that angle alone will not build volume business.

And finally, it is a mistake to give the public the notion that soya flour and soy bean products are luxury foods by demanding prices that are out of reach of the masses. Soy beans are almost as cheap as corn and are usually cheaper than wheat. Soya products belong in the grocery store—not exclusively in the so-called health store.

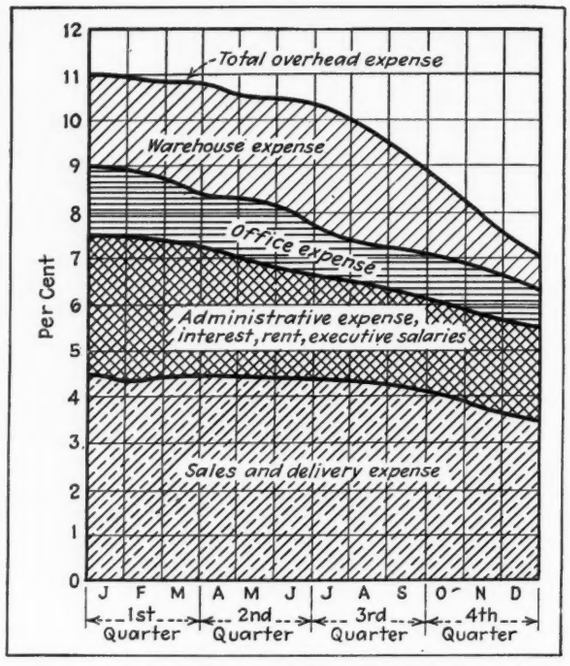
On the other hand, 5 to 20 per cent of edible grades of *uncolored* soya flour added to wheat flour is regarded as a proper use that contributes to the flavor of macaroni and to the flavor and keeping quality of bread. The finest toast we ever ate was made from soya bread. Three men consumed an entire 18 oz. loaf as toast for lunch in addition to other foods.

Green Hahte soy beans have been recommended for canning.

The whole purpose of the better informed advocates of the soy bean is to steer its use into successful and acceptable channels in the American economy, and to avoid giving it a black eye through misuse or unfortunate misunderstandings.

How A Wholesaler Became EFFICIENT

Cut 31.9 Per Cent From Operating Costs



One year of operation of a wholesaler under the system described in this article gave the decrease in total overhead, and in each department's overhead, shown by the above chart.

By WALTER V. DAVIDSON, JR.
New York, N. Y.

BEFORE THE ORGANIZATION and public acceptance of the chain grocery system, the wholesale grocery companies in this country had no great need to operate with a margin of less than 12 per cent. There were a few efficient operators having a margin in the vicinity of 10 per cent, but their efforts were felt only by local competitors.

However, with the arrival and increased popularity of the chain, operating at a total margin between manufacturers and consumers of less than 20 per cent, the wholesaler, in order to exist, had to change his methods. He had to clean house, cut overhead and give his retail outlets much cooperation in selling as well as furnish his retailers merchandise at a price low enough to enable the independents to sell in competition with the chains and make an average mark-up of at least 12 per cent. In this article, I shall attempt to outline and explain the procedure and methods used in revamping an $800,000 a year wholesaler.

Let me list the underlying principles which guided the change-over in producing the desired results:

The problems were:

1. How can buying be controlled so as to reduce the number of options offered for sale, to reduce inventory investment and to improve service to the customer?
2. How can selling concentration be accomplished and a plan for compensation be provided which will reward the salesmen for pushing profitable items and give him a measuring-stick of his own progress and success?
3. How can the general accounting system and accounts receivable be put in gear with stock control and punched card operation?
4. How can office and billing methods be improved so that the warehousemen may select and ship from tabulated invoices calling only for items "in stock," having all items in warehouse sequence? And how can this be done without platform delays or waiting trucks?
5. What warehouse and assembly-line arrangement and organization will give the least amount of lifting, the shortest carries, minimum walking, no back tracking or cross-traffic? What is the logical equipment necessary to insure the fastest possible selection?
6. What delivery and shipping plans will result in lowest cost and maximum service, utilizing continuously the time of driver and helper?

The firm of which I speak carried a standard line of nationally advertised merchandise with no private brands and no produce, although cheese, butter and prepared meats were handled. There were some 2,000 items in stock in a warehouse of three floors and a cellar. The first problem was to determine whether it was advisable to discontinue any items and if so, which ones.

In order to do this, a complete analysis of the commodity line was made, using for this purpose a "commodity information card" which when completely filled out showed the weekly, monthly and yearly movement of every item carried, as well as their "on" and "off" seasons. This procedure made it possible to convince the managers that some 400 of the items they were carrying were not making them any money, in fact, were adding to their deficit by their almost total lack of movement and by their numerous duplications. Thus the first reduction in their inventory investment was made and, at the same time, they received additional warehouse space and gave their salesmen a better chance to concentrate on the remaining items, adding time to their salesmen's work day.

Next, the commodity list was divided into two sections: a "fast moving" or "standard" line; and a "slow moving" or "supplementary" line. The next move was the "coding" of the items. Each item was given a code number, the standard line first with the low numbers and the supplementary line having the high numbers. Commodities of the same class such as cereals, soups and canned fruit were grouped together. Thus if Kellogg's Corn Flakes started the list, the rest of the cereals followed

in sequence before any other class of merchandise began. Great consideration was given to the sequence of items, especially as to size, weight and movement since this code sequence was to be used as the basis of a permanent warehouse arrangement. The fastest moving items were placed nearest the shipping platform, and so on, in order.

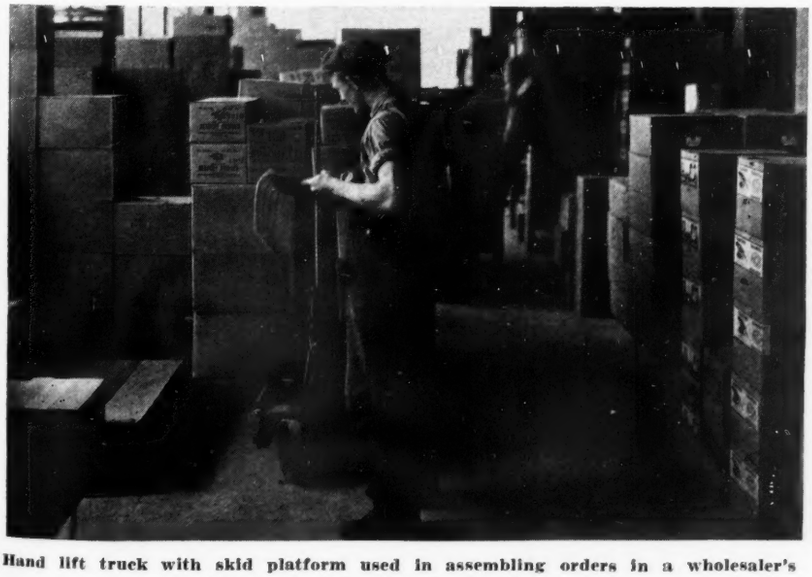
With the completion of the code list, the arrangement of the warehouse was begun. The standard line had about 700 items and the supplementary line about 900. The item having the lowest code number started the "line," i.e., the arrangement of the warehouse was predetermined in a definite pattern. This was governed more or less by the size and shape of the warehouse but nevertheless, in all cases, it was a pattern that would insure one-way flow of merchandise and would eliminate all back-tracking.

This warehouse was a square, 100x80 on the first floor and 100x100 on the other two. The standard line was placed on the first floor and the supplementary on the second. The third floor was given over to the storing of reserve stocks. In this operation, all merchandise did not go directly into line on reception, but went, when received in large quantities, to the reserve section. The reason for this was that if a man had to walk past a freshly received car of corn flakes in order to get a case of Cream of Wheat, it took many extra steps. These steps were time and energy wasted. Multiply them by the number of times each day that a man had to walk past a large quantity of merchandise to get an ordered item and you would have the main reason why the warehouseman, in an average warehouse, can only handle around 30 pieces of merchandise an hour, while under this operation, the slowest of the men handled 100. All reserve stock was loaded on skids when it was received, and by means of hand lift trucks was transported easily and quickly to the third floor where it was stored, still on skids. When the main floor reported that they were getting low on an item, a skid load was brought down and put in line. In the case of the faster moving items, skids were used in the line, while the slower moving items were placed in single rows on the floor.

An integral part of this warehouse plan was the use of tabulating equipment. This was used in many ways, but most important of its functions was that of billing the orders in the same sequence as the warehouse arrangement. Were this not possible, most of the warehouse advantages would have been nullified as the warehousemen would still be making long carries, back tracking and crossing each other's paths, doing double or triple work. However, the use of tabulating equipment did not begin or end with the warehouse. It was used to cut office overhead as well, and was the means of giving accurate buying control, more complete sales analysis and a dependable perpetual inventory.

In the use of the tabulating equipment, card files were set up in the same sequence as the warehouse, i.e. in code number order. Each item had a master card created, a card having the punch pattern of that item as well as price and cost records, control of inventory card numbering, and a complete list of dates and amounts of that item's reception. This master card was used when new shipments arrived or when the price of the item was changed. When a card, made automatically from the master card, was put through the tabulator, the tabulator printed the code number, pieces size, pack, contents, name and description, price and cost of the item that master card represented.

At the time of inaugurating the systems, a complete inventory was taken, and every case of merchandise had a pre-punched card put in file under the proper code. Thus if there were 49 cases of Kellogg's Corn Flakes in stock, 49 cards were put under the code number of Kellogg's Corn Flakes, each card having been made from the master card of that item and calling for one case. If there had been 150 cases on hand, 150 cards would have been put in file. Then, when an order came in for a case of Kellogg's



Hand lift truck with skid platform used in assembling orders in a wholesaler's warehouse operated under the Davidson system.

The Manufacturers' Interest In Lower Cost Distribution

▶ ***All Food manufacturers have a very real stake in the efforts of wholesale grocers to adapt their operations to the current competitive situation. Some of these benefits to the food manufacturer are very real:***

1. Conservation of the time of the manufacturer's salesman. Selling the wholesaler can be done much more rapidly.

2. More rapid turn-over of the manufacturer's goods in second hands.

3. Marked lessening of spoilage returns, most of which have suffered damage in the wholesaler's warehouse and never saw a retailer's store.

4. Manufacturer's salesmen can now spend their time in actual selling instead of mere order taking.

5. Accounts receivable on the food manufacturer's books will be somewhat reduced by the greater rapidity of turn over.

For these reasons this article is of real interest to

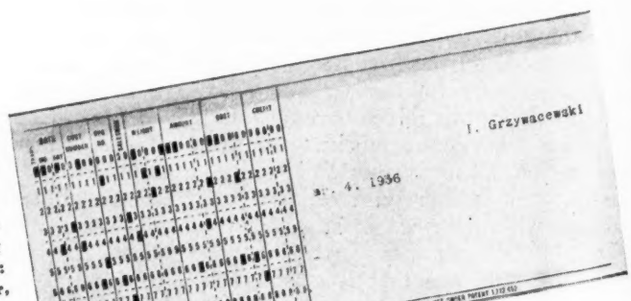
Every Food Manufacturer

Corn Flakes, a card was pulled out of file and put through the tabulator, thereby creating an invoice for one case of corn flakes but at the same time maintaining a perpetual inventory. How? There had been 49 cards in file under the item—now there were only 48 and where there had been 49 cases in the warehouse, there were now only 48. The file corresponds with stock-on-hand.

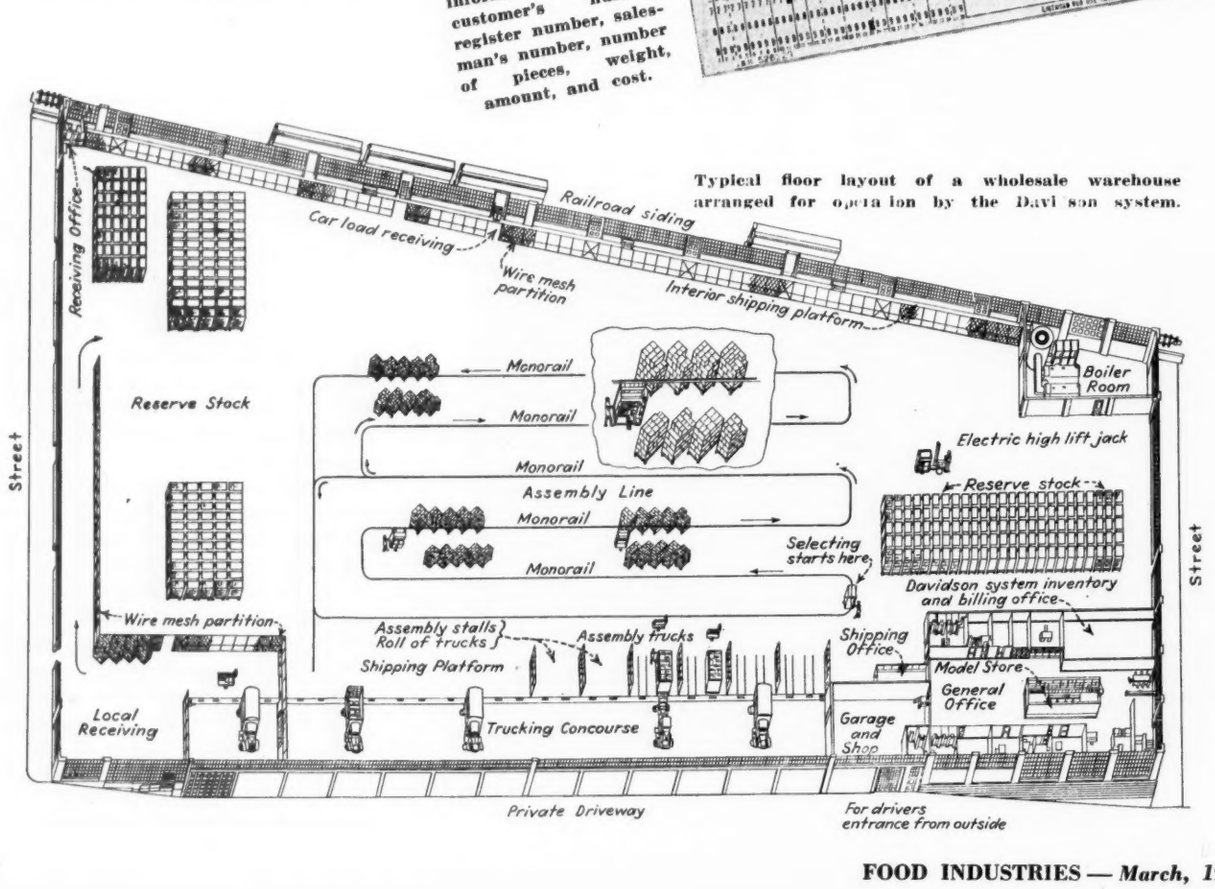
As mentioned before, from the master card we were able consecutively to number each card in file. This numbering of the cards was done at the same time the cards were punched (at the rate of 100 a minute) and enabled us to get the available inventory of an item by subtracting the low numbered card, at the back of the pack, from the high numbered card in the front of the pack, and adding one. In pulling cards from the files, the "puller" always pulled from the back of the pack, thus preserving the consecutive number arrangement. When merchandise was received, cards were immediately punched and put in file in order to keep the inventory correct at all times. The master file clerk received a report from the receiving clerk and at once made his entries on the master card and any price or cost changes that were necessary. The report given him was actually the triplicate of the purchase order and showed the cost of the merchandise, although the amount column had to be filled in by the receiving clerk, this being a check on that clerk's accuracy.

In the pack of cards representing the stock on hand of each item, buying signals were inserted; minimum, danger, and out-of-stock cards. The position of these cards in the files was determined by the length of time necessary to get that item and its movement. If an item moved five cases a week, and took two weeks to get, the minimum card was inserted fifteen cards from the highest numbered card in file, the danger card ten, and the out card one. When a "puller" attempted to pull a card when there were only fifteen left in file, he pulled instead of an inventory card, the minimum signal which was immediately sent to the buyer. When the stock got down to ten cases, the danger signal automatically was pulled and also went to the buyer, showing him that action was imperative. If that item went out-of-stock before the new merchandise arrived, this card was tabulated and then the tabulation of each day's out-of-stock items was sent both to the buyer and the management. Too many outs was a sign of bad buying with no excuse to fall back on, and the buyer seldom was out of stock on any item. This method, dependable in its accuracy, gave real buying control at an actual saving over old methods, for it again enabled a cut to be made in inventory investment, warehouse space and spoilage.

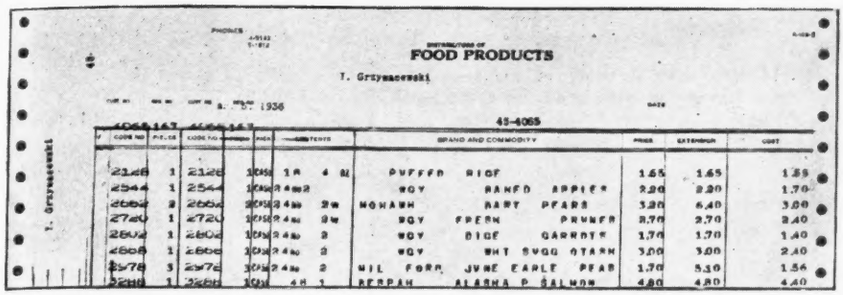
In order to make the code number factor easy to handle, bi-weekly catalogues or order forms were issued for the standard line, and monthly order forms for the supplementary line. These order forms had the complete merchandise line



Summary card used in the Davidson system, upon which the tabulating machine automatically causes to be punched the following information from a bill: customer's number, register number, salesman's number, number of pieces, weight, amount, and cost.



Typical floor layout of a wholesale warehouse arranged for operation by the Davidson system.



FOOD PRODUCTS

T. Grzymacewski

43-4065

CODE NO	PIECES	CODE NO	PICK	CONTENTS	BRAND AND COMMODITY	PRICE	EXTENSION	COST
2126	1	2126	10%	1R 4 M	PUFFED RICE	1.65	1.65	1.39
2544	1	2544	10%	2 4m2	WGY BAKED APPLES	2.20	2.20	1.70
2664	2	2664	10%	3 4m 2W	MOHAWK BABY PEARS	1.20	6.40	3.00
2720	1	2720	10%	2 4m 2W	WGY FRESH PRUNES	2.70	2.70	2.40
2602	1	2602	10%	2 4m 2	WGY DICE CARROTS	1.70	1.70	1.40
2606	1	2606	10%	2 4m 2	WGY WHT SVGO STARH	3.00	3.00	2.40
2578	3	2578	10%	2 4m 2	MIL FORD JUNE EARLY PEAS	1.70	5.10	1.56
2218	1	2218	10%	4R 1	REDFISH ALASKA P SALMON	4.80	4.80	4.40

Typical tabulated invoice made by punch-card system.

2034-o	WGY Tumbler Oats Case 36-16 oz.
2040-i	Cream of Wheat Case 18-28 oz.
2044-s	Hecker's Farina Case 24-20 oz.
2046-s	Hecker's Force Case 24-8 oz.
2050-v	H-O Oats, Quick Case 24-20 oz.
2052-v	H-O Oats, Reg. Case 24-20 oz.
2060-o	Kellogg's Bran Case 12-12 oz.
2062-o	Kellogg's Bran Case 24-6 oz.
2066-s	*Kellogg's Corn Flakes Case 36—8 oz.*
2070-s	Kellogg's Pep Case 24-10 oz.
2074-s	Kellogg's Rice Krispies Case 24-6 oz.
2076-i	Kellogg's Wheat Krispies Case 24-10½ oz.
2080-s	Kellogg's Whole Wheat Bisc. Case 24-12 oz.
2084-s	Maltex Case 12-22 oz.
2090-o	Mother's Plain Oats Case 12-48 oz.
2092-o	Mother's Quick Oats Case 12-48 oz.

Part of a column from a bi-weekly catalog or order form which, under the Davidson system, is distributed to customers. This form lists the standard line under code numbers, and orders can be made simply by circling the number of the desired unit.

listed in code number sequence. They were sent to the customers weekly and served not only as order pads but also as want lists. The customer merely checked the items he wanted and either sent the form to the company or gave it to the salesman when he made a call. Think of how much time was saved by salesmen who, upon arriving at a store, found that the proprietor had his order all ready for him! Think of how much extra time the salesman could then spend selling profitable items! In the order form, each item had a profit code-listing beside it for the salesman's benefit, and he pushed the high margin merchandise. This particular outfit claimed that no retailer would use this order form. But after one year, 65 per cent of their customers were sending in their orders, thereby saving their salesmen at least 20 per cent in time. This time is now spent in finding new outlets.

When these order forms arrived at the warehouse, they were "pulled" and the orders put through the tabulator. The bills were then sent to the warehouse for selection, bills having the same sequence as the warehouse and never calling for an "out-of-stock" item. These bills enabled the selector—the man who selects the goods on the order—to start at the beginning of the selection line and follow a set course to its finish, arriving there with his complete order, without back tracking or traffic jams with other selectors. Bills were priced, extended and costed before ever leaving the tabulator.

When a bill was finished by the tabulator, that machine automatically punched, or rather caused to be punched, in a summary card, all the information of that bill, that is, customer's number, register number, salesman's number, number of pieces, weight, amount and cost. If the bill was a charge account this card was filed under the customer's name and number, and became his accounts receivable ledger. When the bill was paid, the card was withdrawn. At the end of the month, all the accounts-receivable cards remaining in file were put through the tabulator, separated by customers, and the statements were made in that way. Daily, all summary cards, cash, c.o.d. and accounts receivable were put through the tabulator and showed that day's total sales, cost, pieces and weight. A customer-analysis was also kept by means of these summary cards. Each card was duplicated and the duplicates filed in a customer's analysis file. Every time a customer made a purchase, a card was added to his analysis. Then, the cards were put through the tabulator and a list of purchases shown with totals and gross profit made on that customer over any set period of time. Tabbed guide cards, used as separators, showed whether or not a customer had made a purchase in a given month. At the start of the month, all the tabs were turned on the right side of the card, and when a customer made a purchase and a card was inserted into his file, the tab was turned to the left side, so that any customer showing a tab on the right side of his guide was a non-buyer so far that month.

The tabulating equipment also gave a perfect set-up for analysis of weekly sales. In this case, the commodity line was broken down into 80 classes of merchandise, each inventory card having its class number punched into it. As the cards came through the tabulator after a bill had been made, they were taken out and put into racks according to salesmen, each man having a separate rack. At the end of the week, these cards were sorted automatically into class sequence and then put through the tabulator. In this case, only the total cost and selling price for each class was given, and each salesman was presented on Saturday morning with an analysis of his sales for that week. This analysis clearly showed up each salesman's weaknesses, and also the result of merchandise sales on "specials" for that week. It was very much easier to give profitable advice to a salesman on the selling of certain merchandise because this analysis showed so plainly where each salesman had failed to make the grade, and also gave a running record which showed any improvement made. The salesmen were paid by means of this analysis according to the amount of gross profit recorded by each man's analysis. The salesman was charged with 6 per cent of the gross sales and after that amount had been deducted from his gross profit, he was paid 40 per cent of the remainder. Thus if a salesman had gross sales of $3000 with gross profit of $300, he was charged $180 for overhead, and paid 40 per cent or $48 of the remainder. This plan gave the salesman an added incentive to sell the more profitable items.

In order to reach the greatest possible efficiency in the warehouse, certain equipment was used. The most important single change was made in the type of selection truck used. The model designed for this job and used with great success was one of steel, built close to the floor and having a wire partition running

(Turn to page 172)

In step with a trend of the times, old wine greets a modern day in new clothes.

...in Cans

New Container Proved Practical By Test Campaigns

The story of this unusual package for wine is interesting to all who have to do with distribution problems. And it is of technical interest to makers of carbonated beverages especially ginger ale.

Ginger ale manufacturers

Wine manufacturers

All food manufacturers

MARKETING WINE IN CANS has definitely passed from the experimental stage. A year of successful commercial production based on several years of painstaking laboratory study largely by American Can Company has demonstrated the practicability of the new container. Satisfactory test campaigns have been made in New Orleans, New England, Southern California and Texas. Already several California wineries have made permanent installations of canning equipment, thus committing themselves to the use of this new container for a portion of their output in coming seasons. Notable among these is the Roma Wine Co., Inc., of Lodi, Calif., where a plant has been installed with a capacity for canning 1,230,000 gal. of wine per season.

Contrary to rather widespread belief, wine selected for canning does not have to be especially processed in any way to prepare it for preservation in a can. Nevertheless, at the present time, only the fortified sweet wines are being canned. Winery operators claim that when any sound and stable wine of this type is ready for bottling it can also be canned successfully. Certain characteristics of the tin can, such as elimination of photo-chemical changes caused by exposure to sunlight, have caused certain operators to select only the choicest of their wines for canning.

Although there was a small degree of consumer resistance to the new type of container for wine, it is disappearing. One distributor, a wholesale drug house, has expressed the opinion that it is just as easy to sell the wine in cans as in bottles, and believes that ultimately it may be easier.

Direct sales cost for most wine canners is only a 5-per cent brokerage charge. The Roma Wine Co. is, however, putting on a large advertising campaign to promote consumer acceptance.

Cans for wine, like cans for beer, were specifically developed for the purpose. The essential feature of this can is the interior enamel which is alcohol and acid-resistant. Construction of the can does not differ markedly from standard packers cans. Wine cans are lithographed, thus obviating all labeling operations in the winery, which effects a considerable saving of operating costs.

Equipment for wine canning operations is compact, reliable, and practically automatic for its component parts have long been in use in other food plants. To prevent metallic contamination, all parts coming in actual contact with the wines are made of corrosion proof metal. Can runways are also made of this material. Wine cans are sealed in vacuum to eliminate all possible changes that may occur from the action of oxygen in the head space with wine constituents.

Whether to pasteurize the canned wine or not is a moot question, with opinions supporting both sides. Yet a decisive experience is not anticipated. The alcoholic content plus the vacuum closure should make the wine keep nearly indefinitely—or at least as long as it would keep in glass bottles with cork stoppers.

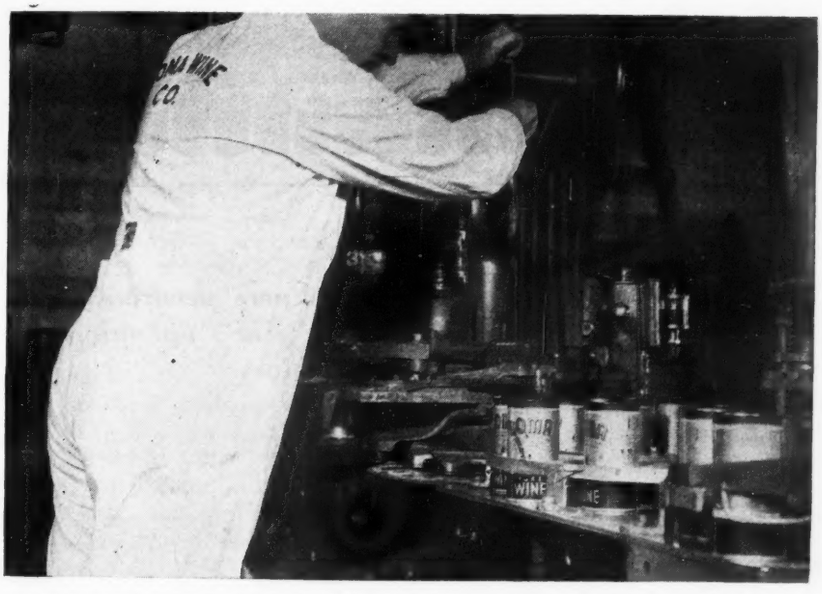
Nevertheless, it is conceivable that a very minute amount of bacterial growth might occur in a wine of very low alcoholic content, though certainly not in a port or sherry. If such a growth should occur the result would be commercial deterioration by slight souring. Certainly no health problem is involved.

Equipment to pack 2,000 cases (24-12-oz. cans each) per eight-hour shift costs about $8,000, and consists of a filling machine, clincher (to partly close the cans and prevent spilling in the next operation), a vacuum closing machine, a can washer to rinse any wine from the exterior of the cans, a can marker and automatic weight testing machine. Such an installation will set up in a space 25 ft. wide by 80 ft. long, as shown in the diagram. Wine storage tanks and the can-feeding disks are placed on a mezzanine floor above the canning room.

Washed filled cans, either pasteurized or not, are dried by a special machine, then go to a caser followed by an automatic sealer. Substantially all that is involved is filling, sealing, packing.

Operating costs are very low. Four men only are required to operate a line. On one season's run of 200,000 cases the following costs were obtained:

	Cost Cents per Case
Labor	1.5
Light, power, heat.....	0.5
24 cans, plus case, including rental of leased equipment	66.0
Depreciation of canning equipment	0.4
Total production costs exclusive of wine....	68.4 cents per case



High speed vacuum closing machine operating on port wine at Roma Wine Co.

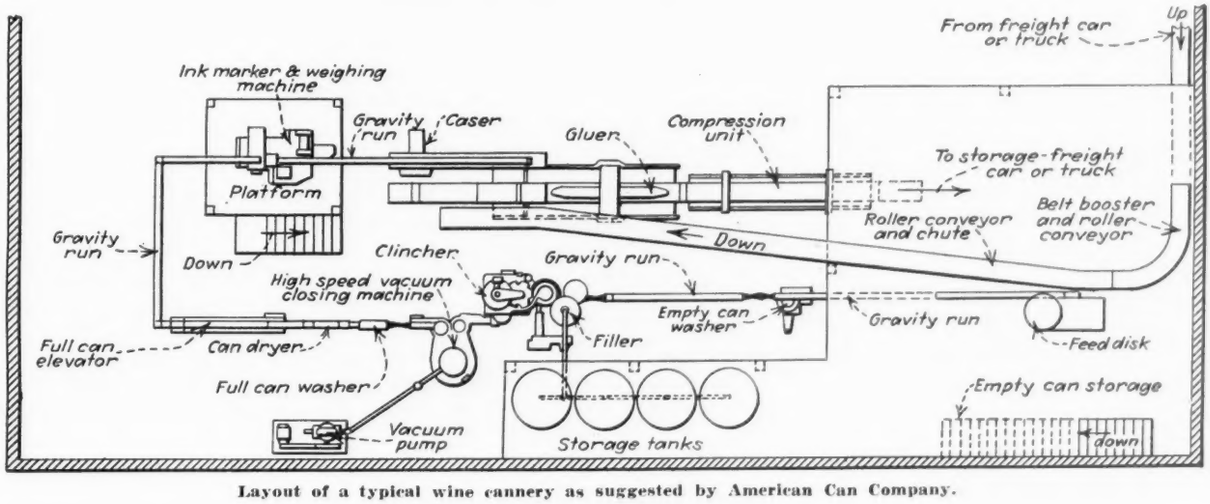
From those wine companies which are packing wine in cans the information is gained that low operating costs are not the only favorable factors. Freedom from breakage is also claimed. But more important is the saving that is made in weight and space.

Canned wine is stated to have proven useful in opening up new sales outlets. Retailers seem to enjoy the same freedom from breakage, and space and weight economy.

A fundamental problem of food merchandising is that of bringing the food to the consumer's table in a condition identical with its original state. Underneath the surface of events there is a certain amount of disagreement as to policy between wine makers and the bottlers and blenders of wine.

At the present time roughly 75 per cent of California wines for domestic consumption east of the Rocky Mountains are shipped in tank cars to bottling plants and only about 25 per cent are bottled at the winery, for the freight charges in a tank car are materially less than the charges for the same amount of wine shipped in bottles. From the viewpoint of the vintner this method of distribution has its weaknesses, for the wine is out of his control once a sale is made. The blender and bottler buys an unbranded commodity and handles it as he sees fit. And no brand reputation can accrue thereby to the wine maker unless he controls the bottler.

During 1937 it should be apparent whether canned wine will have a nationwide acceptance and how it will affect the wine manufacturers' fortunes.



Layout of a typical wine cannery as suggested by American Can Company.

Don't *Package* Your PROFITS!

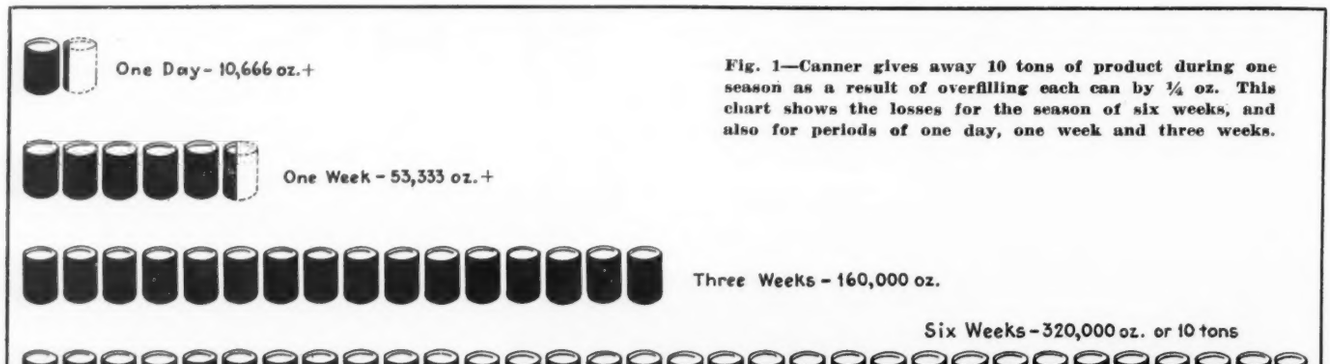


Fig. 1—Canner gives away 10 tons of product during one season as a result of overfilling each can by ¼ oz. This chart shows the losses for the season of six weeks, and also for periods of one day, one week and three weeks.

Weigh the contents of your containers accurately. Otherwise, the overweight during a year's operation will add up to a sizeable loss.

By J. W. SIEVERLING
Columbus, Ohio

ONE TOO MANY CRACKERS IN THE CARTON, an extra nut meat in the bag, a large instead of a small sweet in the package. These extra quantities are small and inexpensive, and their seriousness is not well understood until one resorts to a little arithmetic. One cracker more or less is not serious, but several hundred thousand crackers are. One nut meat is, after all, only one, but a hundred thousand nut meats is another matter. An overweight piece of chocolate confection is fine for the consumer, but mighty hard on the profit and loss statement of the average manufacturing confectioner.

It is quite an accomplishment of management today to walk a 200-lb. hog into a packing plant and even get back the price paid for the hog, much less a profit. Especially is this true when small parts of the animal, in the form of bacon or ham, are not weighed to fractional-ounce accuracy.

Our industrial efficiency in America, generally, is second to none in the world. Unfortunately, however, every one in America, in the food processing business at least, does not yet employ an engineering staff. Every one does not go in for time study or the many other complex planning practices in vogue among a few in the industry.

► ***Food manufacturers necessarily operate on a slim margin of profit. If they are to stay out of the red they must protect that margin. Profits can, and do, disappear rapidly on the packaging line if extra quantities are put into the containers, even though the overweight per package be but a fraction of an ounce. It is surprising how much food can be given away during a run of several thousand packages. And this article, which demonstrates what the dollars and cents losses are, is of interest to***

All Food Manufacturers

Only a short time ago, a call was made on a Wisconsin packer whose business is to supply the breakfast table with fine pork sausage. Even in the Exact Weight Scale Co., where we are constantly thinking and talking fractional-ounce saving in food packaging, we were jolted when told: "We used to give away 40,000 lb. of sausage a year, and did it for some time . . . and that, my friend, is a lot of sausage. Today we pay considerably more attention to fractional-ounce overage in the package."

How, you say, is such a thing possible? Just carelessness, maybe. Not at all. When you consider that each 1-lb. package was ¼-oz. overweight and that 2,500,000 lb. of sausage was produced during the year, simple arithmetic tells the story—39,062.5 lb. of *free* sausage to the customer due to a packaging leak.

It is most unusual for a good canning plant to produce a million cans of one or several different products in a season. Such is the case in many plants from coast to coast. So the amount that goes into each container is certainly important from a profit standpoint. And no canning-plant superintendent can possibly know what the production-line can contains without adequate fractional-ounce weighing equipment for checking these containers. Only accurate weighing will disclose the hourly and daily dribble of comparatively small losses — unseen losses which reach a staggering total for the season's pack.

The production leak resulting from the unnoticed drop-by-drop overage per can is graphically shown in Fig. 1. Note the seriousness of so small an overfill as ¼ oz. per can in a season's pack of 1,280,000 fills. This overfill amounted in six weeks to 320,000 oz. All of which means that 10 tons of canned goods went out of the cannery to the jobber or wholesaler free, and eventually to the consumer—a direct traceable loss from fractional-ounce overfill per can.

Packaging food products to the capacity of the container is an operation entirely different from packaging at a profit from the standpoint of dollars and cents earned at the end of the fiscal year. Probably the best example of such a situation is one which came to light at the National Convention and Exposition of Bakers in Atlantic City last October. It was brought out in the conversation of a gentleman, a New Yorker, engaged in the business of making pie fillings to supply bakers. These pie fillings were put into 30-lb. cans for distribution and sale. The method of handling, filling and packaging was certainly most interesting. Complicated? Not in the least. In fact, very simple. Mixing was done in barrels, according to the gentleman's description of the operation. Cans were filled with dippers and weighed on ordinary platform scales.

Now, pie fillings are expensive. They contain costly ingredients, such as high-priced flavorings, crushed fruits, eggs, chocolate and sugar, as well as other important and expensive substances. The cost of these ingredients alone should be a warning that when overfilled cans go out of the plant profits must go down.

Apparently, fractional-ounce weighing was new to this man in his particular business. A few installation pictures of liquid-fill operations thoroughly convinced him, and he has since returned to his home, done considerable rearranging, installed overhead tanks and fractional-ounce weighing equipment. He is now allowing gravity to replace hand-dipping operations, and visible weight control supplants guess-work weighing of cans.

Table I — What fractional-ounce losses amount to in percentage of the net weight of the package.

Net Weight of Packages

Over or Under Wt.		2 oz.	4 oz.	8 oz.	1 lb.	2 lb.	5 lb.
1/32 oz.	=	1.56%	0.78%	0.39%	0.20%	0.10%	0.04%
1/16 "	=	3.13%	1.56%	0.78%	0.39%	0.20%	0.08%
3/32 "	=	4.69%	2.34%	1.17%	0.59%	0.30%	0.12%
1/8 "	=	6.25%	3.13%	1.56%	0.78%	0.39%	0.15%
5/32 "	=	7.81%	3.91%	1.95%	0.98%	0.49%	0.20%
3/16 "	=	9.36%	4.69%	2.34%	1.17%	0.59%	0.23%
1/4 "	=	12.5 %	6.25%	3.13%	1.56%	0.78%	0.31%
5/16 "	=	15.6 %	7.81%	3.91%	1.95%	0.98%	0.39%
3/8 "	=	18.8 %	9.37%	4.69%	2.34%	1.17%	0.46%
7/16 "	=	21.9 %	10.9 %	5.47%	2.73%	1.36%	0.55%
1/2 "	=	25.0 %	12.5 %	6.25%	3.13%	1.56%	0.63%
5/8 "	=	31.3 %	15.6 %	7.81%	3.91%	1.95%	0.78%
3/4 "	=	37.5 %	18.8 %	9.37%	4.69%	2.34%	0.94%
7/8 "	=	43.8 %	21.9 %	10.9 %	5.47%	2.73%	1.09%
1 "	=	50.0 %	25.0 %	12.5 %	6.25%	3.13%	1.25%

Table II — Number of dollars and cents lost when packages are overfilled with product selling at $0.20 a pound.*

Average Number of Packages Per Day

Ounces Over	Days	50	100	200	500	750	1,000
1/8.....	1	$0.08	$0.16	$0.31	$0.78	$1.17	$1.56
	100	7.81	15.63	31.25	78.13	117.19	156.25
	150	11.72	23.44	46.88	117.19	175.78	234.38
	200	15.63	31.25	62.50	156.25	234.38	312.50
	250	19.53	39.06	78.13	195.31	292.97	390.63
1/4.....	1	0.16	0.31	0.63	1.56	2.34	3.13
	100	15.63	31.25	62.50	156.25	234.38	312.50
	150	23.44	46.88	93.75	234.38	351.52	468.75
	200	31.25	62.50	125.00	312.50	468.75	625.00
	250	39.06	78.13	156.25	390.63	585.94	781.25

* Figures are given to the nearest cent, with 0.5 cent being taken as 1 cent.

It is a well recognized fact among experienced food packers that when food goes from bulk into thousands of individual packages, real management must be injected to earn an adequate profit. There seems to be a considerable range of actual profit in various food packaging operations. Some processors claim 10 per cent, others 5 per cent, and some as low as 2 per cent. Contact with food packers throughout the national market brings the conclusion that the average actual net profit is somewhere between 3 and 4 per cent. Now, if this is more or less an average net profit, the food packer must very seriously consider fractional-ounce weighing per package if his profit is to equal that of the industry in general.

The magnitude of the losses that can be suffered as a result of fractional-ounce overage is shown as percentages in Table I. To take an example from the table, if one-pound packages are being handled in the plant, an overweight of ¼ oz. occasions a 1.56-per cent loss. Of course, there are other places where losses can occur in the average food processing plant, but certainly here is one traceable leak that should be stopped very definitely. Considering the net profit in a highly competitive

Packers must watch the weight of small items accurately, or they may not make any profit on them whatever. This shows how overweight, as well as underweight, is avoided in packaging bacon. The scene is in the plant of Wilson & Co., Chicago.

market to be 3 per cent, approximately one-half of the net profit can be lost through fractional-ounce overage. So it is evident that packaging leaks are a real enemy to profitable operation.

Measured in dollar loss to the food packer, what do packaging leaks amount to? Such losses can best be illustrated with this simple example: In order that the explanation may not be too complex, let us deal in round numbers only. Starting with the assumption that the food packer's product, in finished form, is worth 20 cents per pound (his selling price to the jobber or wholesaler) and using 1,000 packages as a unit, we now have two known factors with which to work. With individual packages, ¼ oz. overweight, the food processor packaging 1,000 cartons or bags will have suffered a packaging leak of $3.13 in one day's operation. One hundred working days, using the same figures shown above, will show a dollar loss of $312.50, while the productive working days of an average year's operation, in this case 250 days, amount to the sizeable sum of $781.25.

Losses as computed for various numbers of packages and different fractional-ounce overages are given in Table II as an example of how packaging leaks look on paper. And from the nomograph (Fig. 2) it is possible to work out dollar losses in packaging operations within your own business. All that is necessary is to know the average over-weight per package and the selling price per pound. The overage can often be arrived at by checking 50 finished packages from the stockroom or the warehouse. Generally, however, 100, or even 500, packages offer a better cross-section.

If you prefer to calculate the loss instead of using the nomograph, you have but to apply this formula: *Loss* equals *overage* times *price per ounce* times *number of packages per day* times *number of days*.

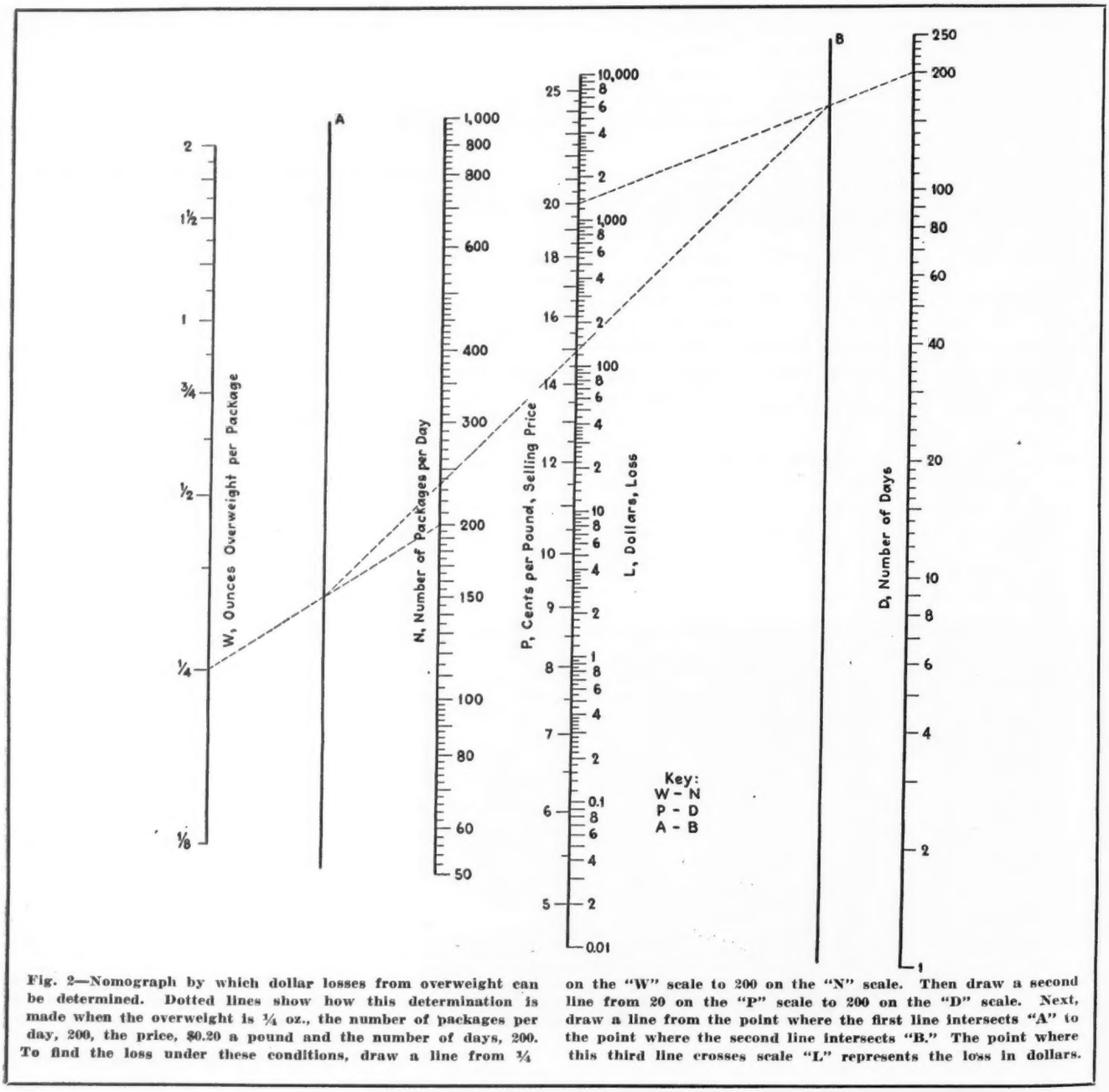


Fig. 2—Nomograph by which dollar losses from overweight can be determined. Dotted lines show how this determination is made when the overweight is ¼ oz., the number of packages per day, 200, the price, $0.20 a pound and the number of days, 200. To find the loss under these conditions, draw a line from ¼ on the "W" scale to 200 on the "N" scale. Then draw a second line from 20 on the "P" scale to 200 on the "D" scale. Next, draw a line from the point where the first line intersects "A" to the point where the second line intersects "B." The point where this third line crosses scale "L" represents the loss in dollars.

How To Remove SPRAY RESIDUES From Cherries*

By

HARRY C. McLEAN and ALBERT L. WEBER

New Jersey Agricultural Experiment Station, New Brunswick, N. J.

▶ ***With the coming of a new food law it is likely that the spray residue problem will be more serious than heretofore. How cherries may be treated is of interest to***

All Fruit Canners
Fruit Packers
Produce Distributors

REQUIREMENTS OF THE FOOD AND DRUG ADMINISTRATION of the U. S. Department of Agriculture and local boards of health make it obligatory for all fruit growers to remove spray residues from fruits to a point where no possible danger to the health of the consumer can develop. For interstate commerce, the maximum spray residue tolerances allowed at present are 0.010 grain of arsenic trioxide, 0.018 grain of lead, and 0.010 grain of fluorine per pound of fruit.

The spray program used by many cherry growers does not cause an excessive amount of residues. But, there are cases where the spray residues are above the legal tolerances. These larger amounts may be caused by several factors: (1) late spraying; (2) "drift" of sprays applied to adjoining apple orchards; and (3) exceedingly light rainfall between the time of lead arsenate spray applications and the harvest period.

Several washing methods for the removal of spray residues were tried on Early Richmond and Montmorency cherries, but only one was found to be safe as well as efficient. Growers have found by experience that sour cherries can not be picked or handled while wet. Therefore any method of spray residue removal needs to be of such a nature that the cherries will not be handled except in packaged form. Handling of the cherries during washing will cause cracking of a large proportion of the skins.

The washing of the cherries to remove the spray residues was carried out as follow:

A 1 per cent solution, by weight, of hydrochloric acid was made by the addition of 3 gal. of 20 deg. Baume commercial muriatic acid to 97 gal. of water. This solution was placed in any suitable container. Some growers used tubs constructed from halves of barrels, others used specially built wooden tanks, while, in one case, a large glass-lined tank (that was available) was used. The cherries were harvested with stems attached, (although no acid burning occurred at the stem end, even if the stem had been removed) and placed in the package in which they were to be marketed. As a rule the package was either a 32-qt. basket crate or climax basket. The entire package was dipped into the tank or barrel containing the acid solution for a period of 30 to 60 seconds. The removal of the residues was facilitated by slow and gentle agitation of the cherry container. After removal from the acid bath, the fruit was allowed to drain for a short time. This procedure was followed by two water rinses carried out in a manner similar to the acid washing, but for shorter periods of time.

The foregoing method was used by the majority of the growers, with slight modifications in some instances. One grower, to make the maximum use of available labor, washed the cherries from 50 acres in the following manner:

The cherries were packed in a 32-qt. basket crate. Four of these at a time were placed in a large glass-lined tank containing 0.25 per cent of acid, but were left in the acid solution without agitation for two to three minutes. These cherries had been sprayed with a mixture of 16 lb. of lime with the addition of 6 lb. of Bentonite-sulphur two weeks previous to harvest. When washed in this manner the cherries showed no visible residue and, upon analysis, showed only traces of arsenic and lead.

These cherries were trucked 400 miles to the market where they brought a premium price. The dipping treatment did not effect the appearance of the containers used for marketing, and the acid did not have an appreciable corrosive action on metal parts.

All of the washed cherries not only had a better market appearance, but were also as good in keeping qualities as the unwashed fruit. The marketability of the cherries was further enhanced if 0.1 per cent of the wetting agent "Vatsol" was added to the acid wash solution.

Lime in the spray mixture aids residue removal when hydrochloric acid solution is used as the washing agent. The method described for washing cherries has also been used effectively to remove lead arsenate residues from currants.

The table gives some results of chemical analyses upon cherries, before and after washing.

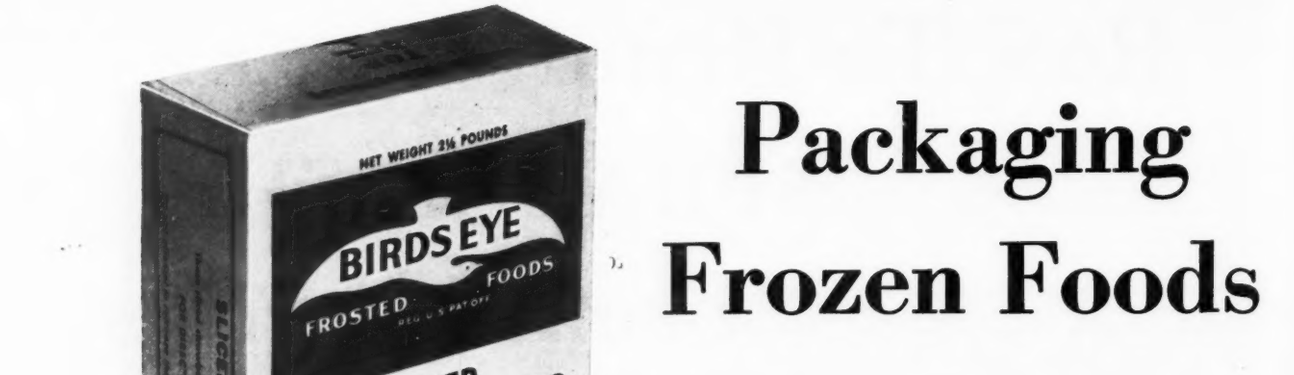
ANALYSIS OF CHERRIES BEFORE AND AFTER WASHING

Lot No.	Treatment of Fruit	GRAINS PER POUND: Arsenic Trioxide As_2O_3	GRAINS PER POUND: Lead Pb
1	None	0.009	0.042
1	Washed (1)	.001	.004
2	None	.045	.122
2	Washed (1)	Trace	.004
3	None (3)	.011	.042
3	Washed (1)	Trace	Trace
3	Washed (2)	Trace	.003
4	None (4)	.004	.016
4	None (5)	.015	.072
Legal Tolerance (Federal)		0.010	0.018

(1) Washed in 1 per cent hydrochloric acid for 30 seconds.
(2) Washed in 0.25 per cent hydrochloric acid for 2 minutes.
(3) This lot of fruit was sprayed with a mixture containing 16 pounds of hydrated lime and 3 pounds of lead arsenate per 100 gallons of water — Lot No. 1 was sprayed with a mixture containing but 4 pounds of lime per 100 gallons. (Larger amounts of lime facilitate removal of arsenic and lead and sulphur residues.)
(4) Four rows away from apple trees that were sprayed one week before harvest of cherries.
(5) Sample from 1st two rows next to apples (drift).

* *Journal Series paper of the New Jersey Agricultural Experiment Station, Department of Spray Residue Investigations.*

Packaging Frozen Foods



Fruits packed in sugar or syrup require a package that is leakproof. The 1-lb. carton is for retail consumer trade. Hotels, clubs, steamships and other institutional customers find the 2½-lb. carton of convenient size.

Protection to contents requires package to be moisture-vapor proof, air tight, and free from odor or taste-imparting properties.

By MARCY BABBITT
New York, N. Y.

"WHAT KIND OF A PACKAGE SHOULD WE USE?" is the question asked in nearly all branches of food manufacture and processing.

It is doubtful that this question has caused in the course of a very few years as much speculation, controversy, and research anywhere as it has in the frozen food industry. Even after more than seven years of study and testing the question is not yet answered to everyone's satisfaction. Some companies engaged in the packing of frozen foods use the rectangular paper-board container designed and constructed to give it the property of being moisture-vapor proof, odor-proof, non-taste imparting, and non-toxic. Other companies use the paraffin-coated sulphite paper cups, tubs and cylinders which were well known in other fields of food packaging before freezing of fruits and vegetables was developed commercially. Still other companies use glass or lacquered tins with slip-cover or friction-top closures. In some cases the packing is done in vacuum or is carried out in an inert gas atmosphere.

In all instances efforts have been made to select the container which is moisture-vapor proof to prevent drying out of the frozen product and which is air-tight to retard enzymic and chemical changes likely to take place during storage over a considerable length of time.

Size and weight of the packages have been dependent upon merchandising as well as production factors. As a matter of fact the merchandising factors have played the most important part in determining the size and proportions of the packages. A review of the various changes which have been made in the dimensions and content weights of the packages will throw an interpretative light upon the demands made by the markets to be reached with frozen perishables.

The first Birdseye Frosted Foods packaged product was the haddock fillet. The Birdseye Packing Co. decided to package these fillets in even units of 1, 5 and 10 lb. The proportions of these packages (with the height kept down to 2 in. because of limitations in the freezing machine), were:

5x3x2 in. for the 1-lb.,
7½x5x2 in. for the 5-lb.,
10x15x2 in. for the 10-lb. carton.

As the frozen products increased in popularity, new markets were created. A new merchandising set-up came into existence and new demands were made for a change in the size of the packages. The explanation is that before 1930 the Birdseye Packing Co., the predecessor of the Frosted Foods Sales Co., as well as others who were freezing fish had no direct retail outlets. The quick-frozen fish was distributed through jobbers who sold it to the retailers. Since there was at that time no way of getting refrigerating equipment suitable to keep the package frozen in the retail stores, the wholesale dealers opened the packages, defrosted the fish, and sold it to the retailers usually as fresh fish. The larger packages were merchandised in the institutional trade channels.

When the now Frosted Foods Sales Co. began to freeze a line of vege-

tables and meats, the retail showcase was developed and the size and dimensions of the package began to take on a retail consumer significance and to require a change. Fruits and vegetables in the 1-lb. carton had a market acceptance. The 1-lb. fish and meat packages met with customer resistance for the reason that the customer was limited in the purchase of fish or meats to the contents of the package. A housewife who wanted an extra chop discovered that she had to buy another pound package to get the one chop. It was the same with many of the fish and meat products.

This method of retail merchandising was naturally a drag upon gross sales. Consequently the company decided to eliminate the 1-lb. packages of fish and meat from its line and to package them in 5-lb. units. These packages are opened by the dealer and their contents sold by the chop or pound, very much like the general method of selling fresh fish and meats in the retail stores. This method of selling is proving popular with the housewife, and has served to increase the volume of the retail business. In-so-far as production is concerned, the maneuver of packaging fish and meat products in larger units has reduced production costs through eliminating waste, cutting packaging costs, and making possible other miscellaneous economies.

When the package for the institutional trade was reconsidered for size, decision was made to continue the packing of the 5 and 10-lb. cartons of fish and meat, but to change the sizes of the vegetables and fruits packages. In the case of vegetables, the 5-lb. package (10x7½x2 in.) was unwieldly. It was practical enough in the freezing machine, in handling, and in shipping, but from the chef's point of view, it was not a package which he could conveniently use.

The general practice among chefs with the 5-lb. vegetable package was to use a portion of the contents at a time. They broke the whole into blocks and used as many of the blocks as were needed. The company hit upon 2½ lb. as being a quantity which the chef could use at one time. In this way the 2½-lb. package came into being. The dimensions of the package are standardized to 10x5 in. as far as width and length are concerned. The height varies from 1⅝ to 2⅛ in., according to the weight per cubic inch of the various products. The pea carton has the dimensions of 10x5x1$\frac{3}{16}$ in., the lima bean carton measures 10x5x1¾ in. These variations in size are essential because the Birdseye freezing operation demands compact filling of the product into the container to press out all air pockets and to give package as close contact as possible with the metal freezing plates.

The company also found that the directions printed on the back of the cartons have an important bearing in the repeat sales. These printed directions have had to be reworded from time to time. Wording which appeared to be quite clear in its meaning to the company personnel was frequently misconstrued by the dealer or consumer. The simplest wording, capable of least misinterpretation, is now used.

Among the latest developments in the retail consumer and institutional packaging of frozen foods is the package for wet masses such as berries in sugar and peaches in syrup. Packaging and freezing of these foods involve making the package leakproof. The leak-proof quality of the package has to continue during the thawing out and emptying of the package as well as during the filling, sealing, wrapping and freezing operations.

The container now in general use for this purpose in the retail consumer trade and also used in the institutional trade is that developed by A. B. Brackett of Frosted Foods Sales Corp. It is a patented container (U.S. Patent No. 1,920,184) made in 1-lb. and 2½-lb. sizes.

This carton is of one piece paperboard construction and has the required rigidity at critical points which have to bear the burden of the weight. When set up, the package is not held together by the interlocking hooks or catches so common to folding cartons. Being made of one piece paper-board, possible leakage of liquids is prevented by the method of folding used. In its basic principle of construction, the carton is quite similar to the water cup children make out of a single sheet of paper.

IN composition the carton is of the same .018 sulphite pulp paper board as that used for the fish cartons and is paraffin coated. The liner is actually a bag of vegetable parchment white in color, non-toxic, and free from odor and taste. It has a nitrocellulose coating which makes it non-porous and leakproof, as well as heat sealing.

The cartons are set up by hand. The parchment paper bag is placed down over a block form having the shape of the bag. Over the bag is placed the carton bottom-side up so that the two can be taken off the form together. The assembled containers are then machine filled. The top of the parchment bag is sealed between heated corrugated bars and folded down tight over the contents in a manner to exclude all excess air and to produce a flat surface which will not interfere too much with the contact of the metal freezing plates with the contents of the package.

The package is overwrapped with waxed glassine on automatic machines before going in the freezing machines. The glassine overwrap helps to hold the end laps of the cartons in place to keep the package leakproof until the consumer is ready to break the seal.

Results of research now being carried on will largely determine what the next move will be in the packaging as well as the marketing of frozen meats, seafoods, fruits, and vegetables.

▶ ***Packers of frozen foods have had to spend years of research and sales tests to learn what kind of protection the foods had to have, what size and style of package the customer will buy, and how directions on package should be worded.***

These principles of food packaging are worthy of study by

All Food Manufacturers

Vegetable parchment bags with a non-porous nitrocellulose coating are used as lines for the leak-proof cartons. The bags are heat sealed.

HEAT TREATMENT OF MILK *Improves* Milk Bread

Flat tops and overhanging ragged sides and ends of loaves on left typify bread made with unheated milk. Rounded tops and shredded sides of loaves on right indicate better dough conditioning gained by use of heat treated milk.

Higher heating of milk and changing of mixing time and speed avoid stickiness and "buckiness" of doughs containing milk solids, give better milk bread*

By OSCAR SKOVHOLT
Quality Bakers of America, New York, N. Y.

RESULTS OF STUDIES ON MILK during the past few years show that its effectiveness as a bread improver is increased by a controlled heat treatment. The effect of the heat treatment is beneficial regardless of the form of milk used.

Ordinary pasteurization temperatures are not sufficient to bring about the changes which influence the effect that milk has on dough properties. Temperatures within 25 or 30 deg. F. of boiling are necessary. This temperature level has also been found to cause a partial coagulation of milk proteins. Some tests have been made in an attempt to prove that some of these proteins are undesirable in bread doughs and that the coagulation lessens this unfavorable effect.

Attention was first called to the effect of heat treating milk for use in bakery products by workers in the U.S. Bureau of Dairy Industry in 1927. (*Journal of Dairy Science* 10, 335–342, 1927). Since that time much has been learned about results that may be obtained by heat treating milk and about what methods to use in carrying out the heat treatment. Most of the concentrated milk available to the baker today has been given the beneficial heat treatment.

Milk, which was available to the baker before the results of the heat treatment studies were put into commercial application, had a disturbing influence upon the bakeshop operations. Fermentation rates were less uniform and the condition of the doughs was less satisfactory for make-up machine operations when milk was used than when it was not or was used in very small quantities.

Many of the production difficulties were at an end when concentrated milks became available. These difficulties arose largely because liquid milk in varying stages of souring has widely different effects upon fermentation rate and dough condition. Even different lots of milk which are apparently sweet have different effects upon doughs. These effects differ with the age of the milk and the conditions under which it was stored.

The condensing or evaporating of milk to give it better keeping qualities also gave it greater uniformity and adapted it for wider use as an ingredient in bread making.

Not only did the use of concentrated milks permit bakeshop operations to be carried out on a time schedule. The practice enabled the baker to use skim milk solids that otherwise would have been wasted.

However there was still plenty of grief for the baker connected with the use of milk. A clue to improved quality found in old recipe books had been overlooked. In several of these books, bread recipes called for the use of scalded milk. This specification may not have been made through knowledge of the improving effect caused by the scalding. It very probably was specified as an additional precaution against bacteria in the raw milk. Regardless of the motive, the scalding did improve mother's bread in many instances.

Unheated milk has an effect that to some extent resembles that of protein-splitting enzymes. This resemblance has led to the thought that the heat treatment is desirable because it kills these enzymes. Some recent experimental work indicates substances known as activators of enzymes may be highly important in dough behavior. Such activators of proteolytic enzymes are probably

* *Based on talk before the New York Section, American Association of Cereal Chemists, Jan. 12, 1937.*

present in unheated milk. The heat treatment probably removes these activators or makes them less effective by incasing them within the coagulated protein particles mentioned earlier in this article.

Although the reasons for the improvement brought about in the baking quality of milk by heat treatment are not clear, the fact itself can be easily demonstrated. Any one baking bread can prove this effect by heating some fluid milk to near the boiling point, then allowing it to cool before adding it to the dough. A comparison of the doughs and bread made with the heated milk and with unheated milk will show superior qualities in all respects in favor of the heat treated milk. This test can be made on any fluid milk, either natural or concentrated. It can also be made on dried milk after first dispersing the dried milk in water. Enough water may be added to give a consistency of ordinary milk or of evaporated milk with little difference in the effectiveness of the heating.

Other factors than heat treating are important in preparing a milk supply suited for human consumption. But from the standpoint of effect of milk upon dough condition and bread quality the proper use of this heat treatment is more important than any other step in the handling or procesing of the milk. This fact has been demonstrated on many occasions. In one experiment, fifteen dried milks which had originated in as many plants and locations throughout the country were used. These dried milks were widely different in effect upon dough and loaf quality when used as received. After dispersing in water and holding at 185 deg. F. for ten minutes, additional dough studies and baking tests showed that all were nearly equal in improving loaf quality.

A baker can in this way determine whether his milk supply has been adequately heat-treated. The test involves only a comparison of results obtained with the milk as received and with the milk after the heat treatment. No baker wants to go to this trouble as a regular procedure to insure a trouble-free source of milk. However, it is a convenient way of determining if the supplier of concentrated milks knows the latest developments in milk technology and is maintaining proper control over his concentration operations.

These newer practices by the milk processors have been highly effective in bringing about uniformity in the effect that milk has in successive doughs. They have eliminated much of the guesswork heretofore practiced.

Research has determined many of the effects that milk solids have upon dough condition and fermentation rates. This information helps the baker to make certain simple corrections if the use of milk solids of good baking quality has an upsetting effect upon bakeshop operations.

ONE EFFECT OF MILK SOLIDS is observed in the dough mixer. When water is added to flour the water is absorbed rather quickly during dough formation. Dried milk stirred into water also takes up in a few moments as much water as it can hold. When either dry milk solids or fluid milk solids are added to flour, the milk proteins appear to become a definite part of the gluten complex. This complex has a water absorbing capacity that is greater than that shown by a dough not containing milk solids. The complex is also slower in its absorption of water. A certain amount of mixing and time is required to form this complex. After its formation the complex continues to absorb water for a considerable time. To obtain the maximum benefit from this absorption capacity, the use of extremely high mixer speeds is not advisable. If high speed mixing is used the limits of gluten tolerance to mixing are likely to be reached before the maximum water absorption has taken place. This is especially true when a high percentage of milk solids is used in the dough stage.

Even with satisfactory mixer operation, a greater drying of doughs takes place during the dough fermentation period when milk solids are used than when they are not. This drying often leads to the impression that milk solids cause "bucky" doughs. This condition is usually caused by allowing doughs to become too firm after having received insufficient development in the mixer. Slacker doughs from the mixer after a slightly longer mixing period will overcome this trouble. This proposed practice is merely allowing for the slower absorption of water. It means that doughs should be judged by their condition at the divider after a moderately long "floor time" for the proper amount of water to use in the mixer instead of by their appearance as they come from the mixer.

The effect of milk solids upon most fermentation reactions has also been determined. Some of these results have been published within the past month. (Skovholt and Bailey, "The Effect of Milk Solids on Fermentation Reactions" *Cereal Chemistry* 14, 108–120, January, 1937).

BEFORE YEAST CAN FUNCTION fermentable sugar must be present. In bread making, particularly in the sponge stage, this sugar is obtained largely from the starch by the action of diastatic enzymes. These ezymes are quite sensitive to changes in environment. If the active acidity or hydrogen-ion concentration of their environment is reduced, they work more slowly. Milk solids reduce the hydrogen-ion concentration in normal doughs. Consequently they reduce diastatic activity. In doughs in which the milk solids are prevented by means of buffers or acids from changing the hydrogen-ion concentration they cause no reduction in diastatic activity or rate of sugar production. For this reason if sponges or doughs are slowed up by the use of milk solids, the addition of either acid or additional diastase will correct the fermentation rate. The most practical way to correct the fermentation rate is usually to use some concentrate containing diastatic enzymes such as the various malt preparations.

The effect of milk solids upon the yeasts and their enzymes directly causing fermentation is different than its effect on diatase. If enough sugar is present, milk solids speed up the rate of gas production in doughs. This speeding up has been shown to be largely due to making more active the enzymes called zymases. There may be some stimulation of yeast growth also, but the effect on the enzymes is quite pronounced. It appears that this stimulating effect is partly due to the change in hydrogen-ion concentration caused by the milk solids. Other factors in the increased activity are also apparent. Some of

(*Turn to page* 173)

▶ ***Use of low percentages of milk solids in bread causes little change in dough character or loaf quality. It is when the milk solids content of bread doughs approach and exceed 4 per cent that stickiness and "buckiness" make milk breads a problem child to the***

Baker
Milk processor
Flour miller
Yeast grower

Are You Planning
A SURVEY?

Surveys and similar instruments have been ridiculed. So were the steamboat and other inventions accepted today. The survey, misused, has earned an unsavory reputation. Properly conducted and interpreted, it has enriched many.

By C. EDGERTON HOVEY
New York, N. Y.

▶ ***Merchandising has evolved along with other sciences through all the years of man's existence. Sluggish for many years like man's own forward progress, most sciences now advance at dizzy speed. Breathless as is the progress today, tomorrow it may seem slow. Merchandising, though only recently passed beyond barter, has progressed, but its greatest growth is still ahead. Sciences passed through the mystic stage, the era of transmutation of metals and other fantastic beliefs, until research established truth in place of fantasy. Merchandising, still called an art, is not yet free from quackery and chicanery. It can rise to the level of other sciences only when it is purged by honest research after truth. Though the instruments for testing merchandising truths are few, the laboratories are legion. Among the instruments are the survey and the market study; the laboratories are wherever goods are sold and used. The science of merchandising is intangible, its truths elusive, for he who would know merchandising must first learn why we behave like human beings. This article is a study of surveys and the type of problems they have been used to solve. Its conclusions affect***

All Food Distributors

THE ROBINSON-PATMAN LAW, in effect since June, 1936, is approved by those who it seems to favor and condemned by those who anticipate hardship as a result of its enforcement. A dense cloud of doubt and confusion hangs over both camps. Since the much-used special discounts, rebates, allowances and price discriminations are ruled out, competition between products will rise to white heat especially between private labels and nationally advertised brands. Merchandising now steps to the center of the stage, especially the kind of merchandising that involves product improvement, package utility and appeal, advertising copy response, and media selection. This new competition threatens drastic penalties for hasty guessing and suggests caution based on facts. Many confusing merchandising problems must arise and many of these will yield solutions only when submitted to the judgment of the consumer.

Manufacturers conduct surveys and field studies to verify the opinions of executives or decide a controversy between them, or when faced with problems that resist any other solution. The tabulated findings of a survey reflect the attitude of those who are questioned, the tabulated purposes of the makers of these surveys mirror the problems of the industry. When the purposes of surveys and the problems which they indicate are tabulated throughout a period of years, the data derived set up decided trends or the absence of them.

Not all surveys made by food manufacturers have found their way into print, but those which have are sufficient in number to serve as a fair index of the manufacturer's problems and the trend of their merchandising interests. To obtain these data, the surveys, and field studies which were recorded in food publications, advertising trade journals and business papers over a ten-year period were tabulated and analyzed. Discussed here are the findings of those tabulations.

Each of the studies tabulated in Table I had for its purpose the unearthing of facts, usually about some one phase of merchandising. Two merchandising problems stand out as equal in importance, both more vital than all the others. These problems involved the product itself and its advertising. Secondary to these in consideration was the sales plan and of least importance the container or package. Although throughout the ten-year period studied, the product and its advertising were most investigated, the emphasis before and during the early part of the depression, was placed on the product itself, while the emphasis since then and at the present time, is on advertising. In fact, advertising is the focal point today and promises to remain so in the future.

It is worth note that though the manufacturer's interest in his product has been fairly consistent throughout the entire time studied, it changed during the depression from his old products to new ones. The depression forced processers to improve old standby products or replace them by products new and more acceptable.

Both before the depression and during the last few years, the consumer was the target of the questionnaire, but during the height of the depression battle, questionnaires were directed to and answered by wholesalers, retailers, and company salesmen. During these worst years, stress was placed on gathering facts relating to the mechanics of distribution and the efficiency of the salesmen and sales plans. The period from 1929 to 1933, was a period of

high pressure on the wholesaler and retailer, at the expense of concentrated effort to sell the consumer. Now that business is better and brains have cleared, the consumer is again the court of last resort.

MANY A DIVIDEND PAYING PRODUCT has had no change of dress, not even an added frill, for 40 years or more. However, the past 10 years has witnessed a parade of new costumes, among them many a gay party dress. Freshen the package, fashion utility into the container, groom the product for the festival. These are the demands today. Dress up problems first were solved within the company family. Some guesses were good, some not so good. The consumer is the final judge—she always was, but yesterday she was not consulted —today she is. It is interesting that more than 80 per cent of the consumer consultations over the choice of package shown in Table II, have been held since 1931.

When the manufacturer slides his product under the consumer microscope, he looks for many things. As is often the case with microscopic examination, things not looked for flash unexpectedly into view, while things looked for assume strange and distorted shapes. Often the results of these studies revealed facts unsought or facts that shattered age-old beliefs and venerated customs. Surprising results were obtained when manufacturers for the first time learned how their product was served in the home, in what proportion it was served raw or cooked or mixed with other foods. A condensed milk processor who merchandised a certain area with the firm belief that the largest portion of his product was consumed as a baby food, discovered on examination that this use of the product represented but a small portion of the demand. It was found that the product was more used as coffee cream, for ice cream making, for cooking and as an adult beverage than as a baby food. Similarly a flour miller who merchandised his flour for bread-baking, learned that in the consumer's kitchen bread-making was minor to cookie and cake-baking and about on a par in use of flour to general cooking.

"Jingo" may be a better name for an edible than "Bingo," or it may not. The sane decision rests with the housewife, and she may call it by an entirely different but more appropriate name. Trust her judgment. Manufacturers have many times submitted samples of a new product to the consumer who has with unerring accuracy named it appropriately. The proof comes from the profit side of the ledger.

The use of samples or other inducements (see Table III) has often increased the per cent of return from questionnaires as well as the accuracy. Samples and other inducements create an amiable attitude toward the questioning with the result that a greater number of thoughtful returns are collected per unit of cost. An interesting example of this is furnished by the manufacturer who was anxious to market only one of a group of new products and the one selected naturally had to be the best seller. To determine the product which promised the greatest sales volume, containers of each of the products were placed side by side in offices with a printed invitation to the employees to help themselves. The containers were replenished on succeeding days and results noted. Repeatedly the container of one of the products in all offices was first to be emptied, so the product in this container was therefore selected from the group to be merchandised as the one product with the greatest consumer appeal. Valuable as samples may be as inducements to promote best results from surveys, nevertheless their use has given place in the last few years to contests with prize awards.

Surprising though it may be, offerings of a large number of small awards often produce better returns than an offering of a large prize totaling more in the aggregate than the sum of the small awards. Most of us feel that our chance of winning a contest award is slight when but one large amount is offered. We fear the high competition. When, however, many small prizes are offered, we imagine all the competition centered on the first prize, and enter confident of our chance for a small award. Regardless of the offerings, prize contests have brought volumes of answers to questionnaires.

A FOOD PROCESSOR may consider his product a "delightful breakfast beverage," fully convinced of the appropriateness of the description. He may be disappointed to learn that what the mass of users call his product is just a good "pick-me-up." But if he is wise, "pick-me-up" will describe his product on the label and in all advertising. Many successful product descriptions have sprung from the masses. Users' descriptions usually step up sales, for such descriptions are natural and convincing, even though they often lack dignity.

What a blow it is to a producer to learn that the blend or flavor that satisfies the palate of a large cross-section of the Manhattanites is unanimously rejected by Bostonites, who as a group insist on another blend or flavor. This may require a revision of product with greater variety of blends and flavors, to capture coveted markets. The manufacturer may begrudge this expense, but it is generally better than the losses incurred by sales and advertising costs in unhospitable areas. Surveys have disclosed remarkable variation in taste and preference in localities "no more widely separated than Brooklyn and Hartford . . . Though each city showed consistently the same preference."

If you are in doubt about your product, its package or container, how to name it or describe it, how to advertise, what copy, and where to place it, ask the user for the answer. You will get it correctly. If the review of these surveys is a true index, unquestionably then there is a definite trend toward submitting problems to the consumer for accurate decisions. The problem that is submitted most today and will no doubt be tomorrow, is the advertising problem.

TABLE I

Proportion of Surveys Directed At Various Objectives

	Per cent of Total
Inquiries about Product	31.4
Inquiries about Advertising	31.4
Inquiries about Sales Plan	27.2
Inquiries about Packaging	10.0

TABLE II

Information Sought From Consumer Pertaining to Product

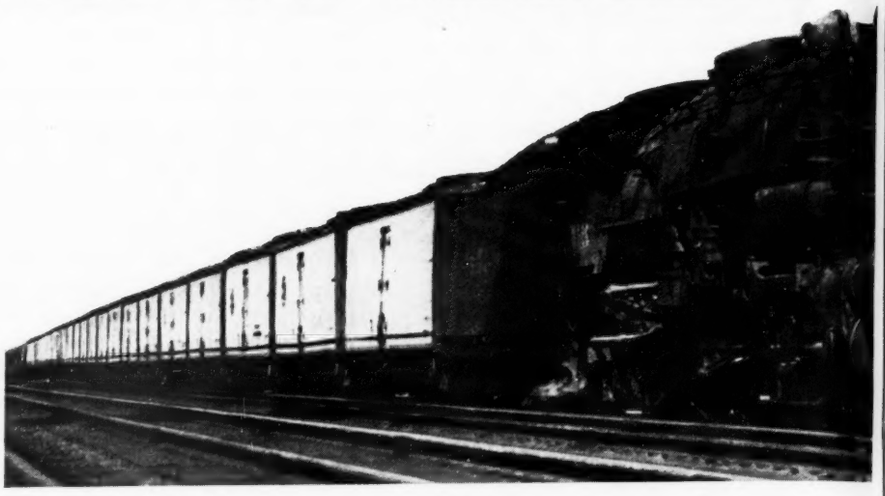
	Per cent of Total
Consumer acceptance of NEW product	42.8
Consumer acceptance of OLD product	33.3
Housewife's method of serving OLD product	14.3
NEW product name or selection from variety	9.6

TABLE III

Kinds of Inducements Used With Surveys

	Per cent of Total
Samples	58.3
Contests	33.4
Premiums	8.3

Keeping Food From Freezing
ON WAY TO MARKET



Safety automatic heating system maintains uniform temperature in refrigerator cars in cold weather

▶ The insulation of refrigerator cars is no guarantee against damage to perishables by freezing enroute to market in winter. The cars must be heated, and usually this has been done in hit or miss fashion by portable heaters put into the ice bunkers when and if conditions so demand. These heaters give neither controlled temperature nor even distribution of heat. And fumes from them sometimes cause damage. So the safe, automatically controlled heating system described in this article is of interest to

All distributors of perishables

HEATING REFRIGERATOR CARS has, oddly enough, been somewhat more of a problem than refrigerating them. Various types of portable heating devices have been used in the cars to prevent the temperature from dropping below the freezing point for perishable foods during shipment in the dead of winter. But for the most part it has been difficult to get uniform heating and to regulate the temperature closely and with surety. It has been the practice to put the heaters in the ice bunkers if and when weather conditions warrant heater service, this perhaps being in the middle of a journey.

The requirements of a satisfactory car heater, however, apparently have been incorporated in an automatic system developed by Safety Car Heating & Lighting Co., New York. Designed for freight and express refrigerator cars of the end-ice-bunker type, this system consists essentially of a heating unit mounted under the floor of the car and loops of radiating pipe laid under the floor racks. The heater, which is thermostatically controlled, includes a main burner, a pilot burner and a small heat exchanger through which the heating fluid from the radiating pipes circulates. Fig. 1 shows the complete heating system as installed in a car, the amount of piping illustrated being sufficient to meet the most extreme winter conditions. Fig. 2 shows the construction of the heater.

This system has been described as a safety unit, because the diethylene glycol solution circulating through the pipes inside the car can produce no harmful effects on the cargo of perishables, such as may be caused by gas fumes from some types of heaters. And even distribution of heat in the car is obtained because the heating pipes extend the full length of the floor.

Liquefied petroleum gas, carried in a tank suspended from the car floor, is the fuel burned in the heater. Enough of this fuel can be carried to provide continuous operation at full capacity for 300 hours. The system is designed to keep the inside temperature of the car safely above freezing with an outside temperature of –40 deg. F., and one pound of fuel per hour is consumed in continuous operation at this temperature.

Records of performance in actual operation show what the heating system will do. Two such records are represented by Fig. 3 and Fig. 4. These are charts illustrating how the temperature inside the car is main-

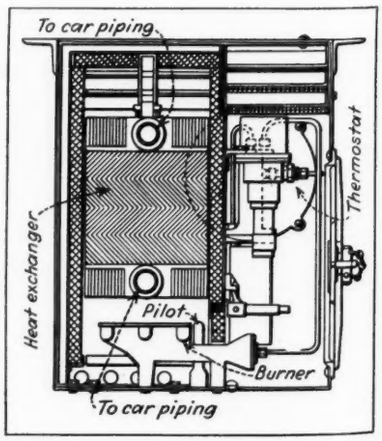


Fig. 2—Layout of heating unit, showing burner, heat exchanger and thermostatic control.

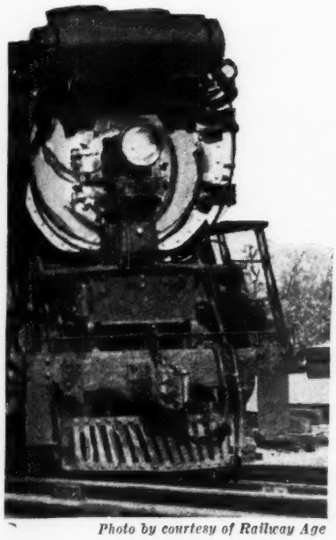


Photo by courtesy of Railway Age

tained almost constant while the car travels cross-country under widely varying temperatures which reach a low of –12 deg. F.

The chart shown as Fig. 3 represents the temperatures inside and outside a car carrying dressed turkeys from Columbus, Mont., to New York, in December, 1933. The thermostat controlling the heater was set at 34 deg. F., and the average temperature inside the car during the seven-day trip was 34 deg. F.

Data on a shipment of hot-house rhubarb from Sumner, Wash., to Jersey City, N. J., are charted in Fig. 4. In this case, the car was eleven days enroute and then was held an additional seven days before being unloaded. But the average temperature in the car during that eighteen-day period was 36 deg. F., the temperature for which the thermostat was set.

Dressed turkeys and hot-house rhubarb are but two examples of a long list of perishables which must be protected against low temperature while being moved to market in cold weather. Even canned foods may suffer if chilled to such an extent that moisture condenses on the cans when transferred from the car to a warm warehouse. The moisture wrinkles the labels and causes the cans to rust.

Nor are cross-country shipments the only ones that need protection against excessively low temperatures. Local shipments sometimes are tied up on sidings or in freight yards long enough for damage to occur in unheated cars. And there may be unavoidable delays enroute when snow or extreme cold cripples the railroads' facilities.

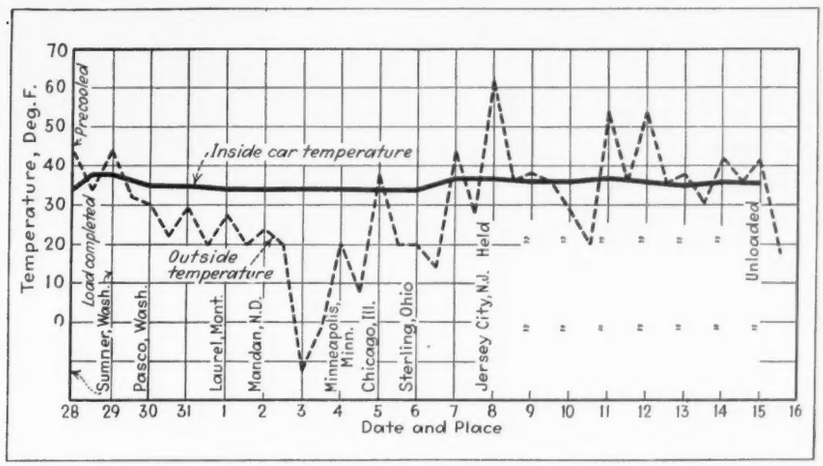


Fig. 4—Chart showing temperatures inside and outside of car of hot-house rhubarb enroute to Jersey City, N. J., from Sumner, Wash., in January and February, 1933. The shipment was on the road eleven days and was held an additional seven days before being unloaded, but automatic heating system kept average temperature of cargo at 36 deg. F.

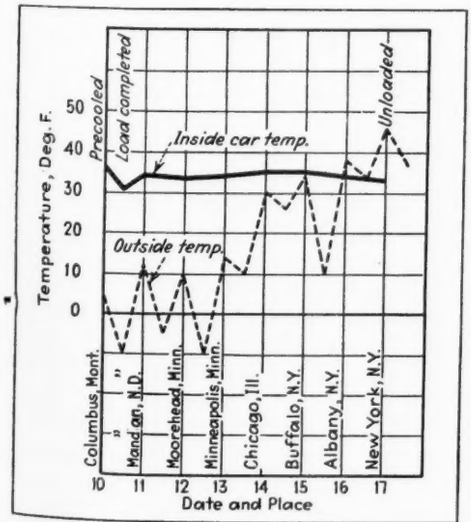


Fig. 3—Chart showing even temperature maintained in car by automatic heating system during shipment of dressed turkeys from Columbia, Mont., to New York, in December, 1933.

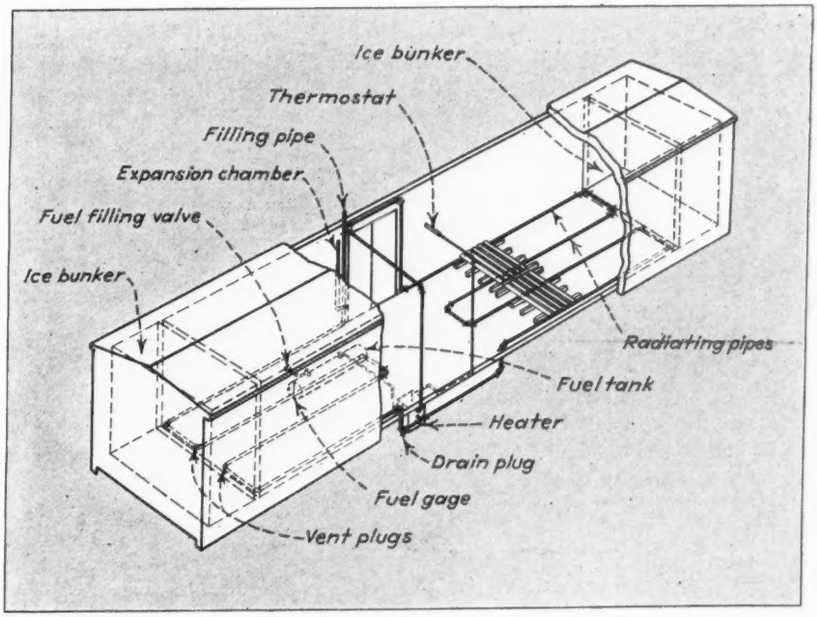


Fig. 1—Diagram of automatic heating system as installed in refrigerator car.

Mold and Bacteria Control

Cuts Spoilage Loss

Methods used by margarine maker show savings made when plant is really clean

By LEROY V. STRASBURGER
Strasburger & Siegel, Baltimore, Md.

Petri dish with developed mold colonies, such as was used in determining how to reduce spoilage losses in the plant discussed in this article.

EVERY FOOD, under unfavorable conditions of production or storage, will spoil. However, losses from such spoilage can be largely checked by means of plant modernization and bacteriological control. And the cost of plant remodeling and of revamping control methods need not be a great burden. In fact, it can often be paid out of funds budgeted to contingencies, but actually set aside to cover financial losses incurred through spoilage.

The rate or degree of spoilage is determined by a number of factors. Most important among these are the moisture content of the food, its hydrogen-ion concentration (degree of acidity or alkalinity), temperature, chemical composition, and the methods or practices of manufacture, storage and distribution.

Roughly speaking, the moisture content of a food governs its keeping qualities. Dried foods and cereals resist all but the most unfavorable conditions without any material change in quality. The highly perishable foods at the upper end of the mixture range include many of the common fruits and vegetables.

Butter and butter substitutes lie at the lower range of the moisture scale. The general composition and structure of these products, however, subject them to additional spoilage hazards. Chemical changes brought about by oxidation of the fats are most often encountered. The lack of homogeneity which allows the formation of milk-droplets, air spaces and free moisture places them in the class of quickly perishable foods. If butter and its contemporaries, butterine and margarine, were uniform masses carrying their 10 to 16 per cent of moisture evenly dispersed, the methods of manufacture and distribution might not require such constant vigilance and attention as now.

The occurrence of fungus growth in these dairy products is responsible for more than occasional "returns" to producers. At times actual losses may reach a point where they seriously affect sales. Several years ago such a condition threatened a manufacturer of margarine who enlisted our assistance. A review of the manufacturing conditions and the changes advocated may bring to light some points of interest to other producers.

The margarine being returned by retailers had been produced anywhere from ten days to three months prior to its becoming unsalable. In practically every instance, mold growth had occurred directly beneath the paper wrapper. At times only one or more small areas of mold had developed, while in other instances, fungus growth was observed over a large portion of the outer surface of the print. It was only seldom that a package was found where the mold hyphae had penetrated into the mass of the margarine. Spoilage was encountered both in the winter and the summer months, although the amount of returned merchandise was greater in, or following, warm weather. But-

ter and its substitutes are of an acidic nature. In the presence of oxygen and moisture any mold spores present will germinate readily. In this instance, the margarine was carefully examined to determine whether uneven cutting of the print or improper wrapping was allowing air spaces to occur. This part of the packaging was above reproach.

The factory itself was a one story brick building divided into two large rooms. A plan of it is shown in the accompanying sketch. In the rear room which housed the actual manufacturing were contained the churns, sprays, crystallizing tank, the pasteurizers, the salting machine, worker and the mixing machine. The crystallized margarine was collected in wooden tank trucks and after refrigerated maturing, salt was added and the moisture content reduced to the required point.

The margarine was then conveyed to the packing room in other wooden trucks. Here it was cut to print size, wrapped in vegetable parchment paper and then sealed in waxed cartons. The cutting and wrapping were entirely manual operations. The finished packages were placed in cold storage and held until ordered out.

When the plant was crowded, the finished product and the maturing margarine in trucks occupied the same cold storage space. Walls, floors and ceilings were of either brick or concrete construction. All of the barreled oleo and vegetable oils were stored in a cool concrete cellar until needed in the manufacturing room.

The cartons and wrappers were stored in an adjoining building. The room in which they were placed was quite dusty and at times the open packages themselves were dust covered. This storage room was not far distant from the yard where there was a refuse pile of moldy margarine, wrappers and cartons.

Since the spores of air-borne mold that fall upon a suitable medium will rapidly reproduce themselves, sterile Petri dishes or plates containing such a medium were exposed for five minutes at various points in the manufacturing and packing rooms. A Petri dish with developed mold colonies is shown in the accompanying photograph. The number of mold colonies developing after five days incubation at 25 deg. C. were taken as a measure of the air contamination. Clean air should show not more than one or two colonies per plate. In addition, scrapings from all wooden equipment and samples at each stage of the manufacturing process were plated out in the same way for mold and bacteria counts. Counts were also made on representative wrappers and cartons. Our survey was made during the summer months. At this time circulating fans were being used in the packing room. Plates were exposed when the fans were still and when they were operating.

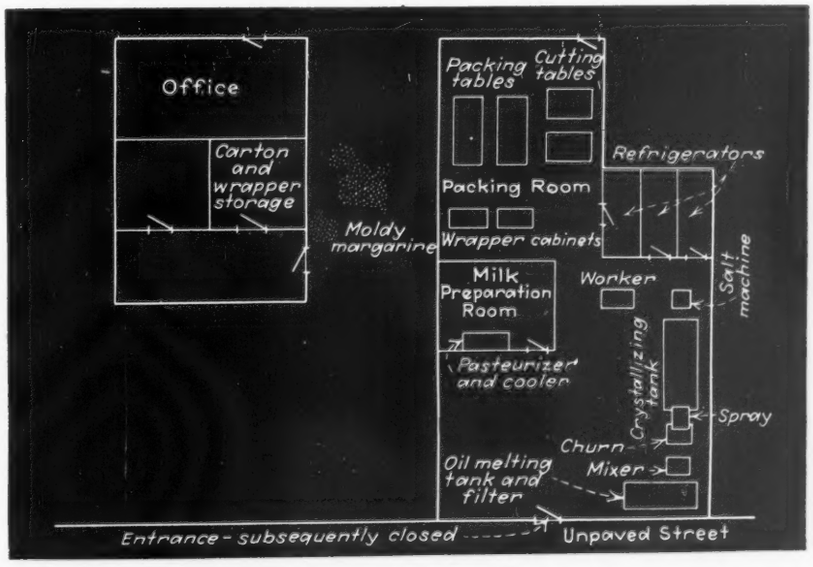
Some air contamination was found in the packing room. Forced circulation of air accentuated the number of mold colonies found on the plates. One place having high air contamination was found in the manufacturing room. This was at a rear door fronting on a dusty, unpaved street which was used as a receiving entrance for barreled oils. The paper wrappers and the cartons were found to be badly contaminated with mold spores. The following recommended changes were effective in reducing the spoilage:

1. The rear door was closed off entirely and all receiving of raw materials was kept apart from the manufacturing room.
2. Sodium hypochlorite solutions were used following the daily clean-up and liberally applied at a concentration of one hundred to two hundred parts per million on all equipment, walls and floors.
3. Refrigeration rooms that were used for goods in process of manufacture were never used for finished packaged merchandise.
4. All moldy returned goods were destroyed immediately after inspection, so that no mold contamination could be introduced from external sources.
5. All cartons and paper wrappings were stored in a clean dust-proof room. Packages of the wrappers were opened each evening and placed in metal cabinets in the packaging room. These cabinets contained open pans in which formalin was placed and the cabinets tightly closed. In this manner, the wrappers were subjected to formalin vapors in a concentrated form for a period of at least twelve hours before they were used.
6. The use of fans in the packing room was abandoned as far as possible.

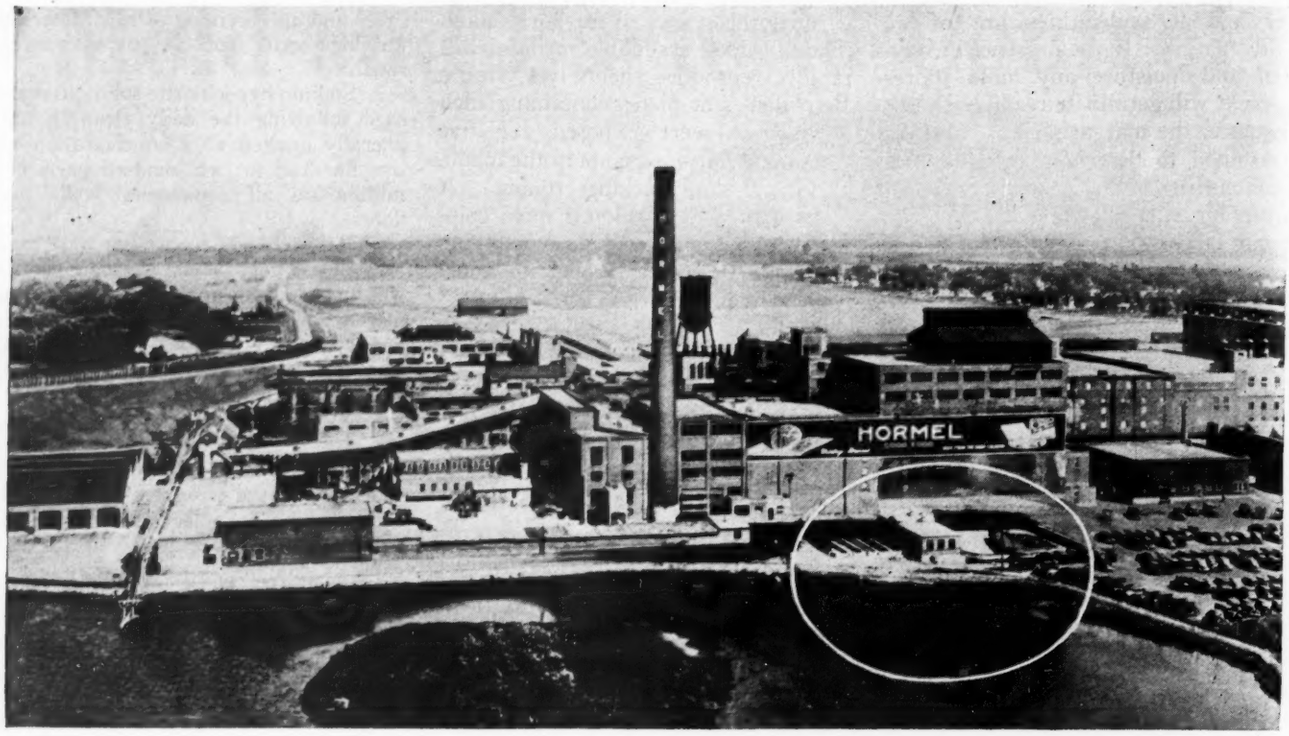
MANY OF THE NEWER and most modern plants producing margarine utilize bacterially clean air. This is obtained by operating under a slight pressure and circulating the air through several types of filtering media. In many cases the filtered air is pre-cooled and a definite humidity maintained. Where such equipment is not available, frequent checks upon the bacterial quality of the air in the manufacturing and packing rooms is advisable. Such examinations aid in keeping the plant really *clean*.

▶ ***Food manufacturers often can save enough by reducing the losses from product spoilage to pay for the cost of modernizing their plants and establishing bacteriological control. This article shows how a margarine producer used methods that can be employed by***

All Food Manufacturers



Layout of margarine plant where bacteriological control cuts spoilage losses.



General view of the packing plant of Geo. A. Hormel & Co., Austin, Minn. In the foreground (inside white circle) may be seen the plant where sewage is treated with chlorine to precipitate the protein material.

Making SEWAGE *Pay Its Way*

From packing house waste, Hormel recovers sludge worth more than cost of treatment. Developed by research, the method has proven highly practicable over a period of years.

MORE THAN SIX YEARS OF OPERATION has definitely tested the mettle of the new method of treating waste from pork operations introduced by Geo. A. Hormel & Co. to eliminate pollution in Red Cedar River at Austin, Minn. Economical as to first cost, as a method of chemical precipitation the system is highly efficient and low in operating expense, and it will even show a profit under certain conditions. And what is of prime importance to the food industries, it produces no undesirable odors. Moreover, it is foolproof and simple to operate, and it results in a sewage which has an antiseptic effect upon pollution that enters the stream from another source, as from a municipal sewage plant.

In developing this new method of treating sewage, Hormel resorted to the most effective of all industrial weapons—research.[1] For at that time, no method of treatment was known which was both satisfactory and economical when applied to the packing-plant problem. Preliminary considerations ruled out biological methods of treatment because of high first cost, high cost of operation and the fact that objectionable odors were associated with the process. Then the protein, which largely composes packing house waste, cannot be recovered by that method, and if recovered it can be sold. The activated-sludge process will precipitate a comparatively large portion of the proteins, but the cost of dewatering the sludge is excessive.

So chemical precipitation was decided upon, and extensive studies were made of the several coagulants available. Ferric chloride had been widely used in sewage treatment, but it did not meet the conditions laid

[1] Hormel enlisted the aid of the University of Minnesota and of State health officials, and Dr. H. O. Halvorson of the University played an important part in working out the new method.

down for the proposed Hormel plant. The sludge became septic so rapidly that odor nuisances prevented the use of this chemical. Besides, the chemical could not be relied upon to precipitate proteins from all types of packing house waste. Yet ferric chloride was the most efficient of the precipitating agents used in the past.

Investigation of untried coagulants resulted in the selection of chlorine, and after extensive tests on a semi-plant scale, Hormel built its present sewage treatment plant (see accompanying line drawing and photographs). Capable of handling 1,500,000 gal. in 24 hours, the plant cost $70,000. It consists of a primary clarifier in which the heavier solids settle out and grease floats to the top; mixing tanks where the chlorine is injected into the partially clarified sewage, and a secondary clarifier where remaining solids are precipitated. The drawing also shows a plant for dewatering the sludge and milling it to produce tankage, but this is not used by Hormel at present.

There are five bays in the primary clarifier, but only four of them are in use. Three of the four are employed for primary clarification, and the other serves as a sludge reservoir. Each of the bays measures 40 ft. in length and 7 ft. in width. They are 15 ft. deep, but under present practice, the sewage is maintained at a depth of only 6 ft. Experience demonstrated that circulation sets up in the sewage when it is deeper than that, impairing proper sedimentation.

▶ More extensive treatment of sewage is likely to be legislated upon the food industries in the near future. Bills restricting the contamination of navigable streams are up for consideration in Congress, and states and municipalities are having more to say about the condition of their streams. So the principle involved in and the results obtained with the chlorine-precipitation method used by Hormel are of interest to

All Food Manufacturers

The solid material which settles to the bottom of these bays is moved into a sump at one end by a drag conveyor, and from there it is pumped into the sludge basin. The grease floating on the sewage in the bays is skimmed off by hand and rendered as inedible fat.

After remaining in the primary clarifier for about 30 minutes, the sewage is pumped into the chlorine mixing tanks. These are two chambers measuring 15x15x15 ft., each equipped with an agitator. A portion of the sewage entering the mixing tanks is delivered through ejectors by a high-pressure centrifugal pump, creating a vacuum which sucks chlorine gas into the sewage. The amount of chlorine entering is proportional to the vacuum on the ejectors, and vacuum gages are used to indicate the amount of chemical being used. Chlorine is supplied to the ejectors from two cylindrical tanks located near the mixing tanks. Since considerable heat is absorbed as the liquid chlorine vaporizes, these cylinders are set in water to maintain a uniform temperature. The supply of chlorine is purchased in tank cars, and it is pumped from these into the ejector-supply tanks.

After ten to fifteen minutes of agitation, the sewage is pumped into the secondary clarifier by an automatically controlled diaphragm pump. This is on one minute and off four to allow efficient precipitation. The secondary clarifier measures 70x70 ft., with the sewage standing in it to a depth of about 8½ ft. The proteins, which are precipitated out in about 45 minutes, settle to the bottom of this large basin to be collected into a sump by a mechanical scraper and pumped to the sludge reservoir. Because of the gas entrained in it, a small portion of the sludge floats to the top. But a mechanical skimmer collects this floating matter into a gutter at one side of the clarifier, and it is again passed through the mixing tanks. Agitation in the mixers removes the entrained gas so that the material settles out in the secondary basin.

It may be seen that the sewage passes quickly through the treating process. This is important because the amount of protein precipitated by the chlorine is reduced if the

Close-up view of Hormel sewage-treatment plant. Secondary clarifier is shown in foreground. The building houses chlorinating equipment and mixing tanks, and the primary clarifier is behind the building.

sewage is allowed to stand in the primary basin long enough for protein decomposition to take place. The sewage must be fresh for proper results.

Precipitation in the secondary clarifier completes the treatment, and the effluent is discharged directly into the stream. But it remains to dispose of the sludge. At present, Hormel is pumping this into tank trucks and hauling it away to be used locally as fertilizer. However, it is economically feasible to dewater the sludge and pass it through a milling machine to produce fertilizer. The dewatering is best done with a vacuum filter, with a rotary dryer completing the operation. The filter reduces the water content by about 20 per cent.

THE SEWAGE which the Hormel disposal plant treats so efficiently consists principally of water, blood and grease, with some fecal matter, from pork operations. It is distinctly nitrogeneous, averaging about 100 p.p.m. of organic nitrogen, or about 834.5 lb. of organic nitrogen in 1,000,000 gal. This concentration is obtained by passing condenser and other clear water from the plant directly to the stream. This practice cuts the volume of sewage to be treated in half, with consequent reduction in pumping costs and chlorine consumption. And it permits more efficient operation of the treating plant, because the system operates better with concentrated sewage. Therein lies one of the advantages of the chlorine precipitation system. In some plants, it is better to dilute the sewage as much as possible, resulting in excessive use of water, with increased costs.

The volume of sewage treated in a day varies, of course, but for purposes of arriving at definite results, a daily run of 900,000 gal. will be considered. From this amount, 5 tons of dry sludge will be recovered. The reduction of suspended solids in the sewage amounts to about 98 per cent, and the removal of organic nitrogen, 70 to 75 per cent. At the same time, there is a reduction of biological oxygen demand (B.O.D.)* slightly greater than that in organic nitrogen. After drying, the chlorine precipitated sludge (secondary clarifier) analyzes as follows: Moisture, 3.70 per cent; protein, 48.90 per cent; ammonia, 9.50 per cent; fat, 22.72 per cent; and ash, 11.60 per cent. Sludge from the primary clarifier, where chlorine is not used, contains from 4.0 to 5.5 per cent ammonia.

It costs comparatively little to operate this plant. Chlorine is the principal item of expense. About 1,800 lb. of this chemical is consumed daily, and at the delivered price of 2.77 cents a pound, this costs $48.86 a day. The other items of operating cost include the pay of four men, one on each six-hour shift, and the cost of power to operate the pumps. Allowing $18 for labor and $4.50 for power, and adding $20 for interest, depreciation and upkeep, the total daily cost amounts to $91.36. Then there must be added to the treatment cost, the expense of hauling away in tank trucks some 12,000 gal. of sludge a day.

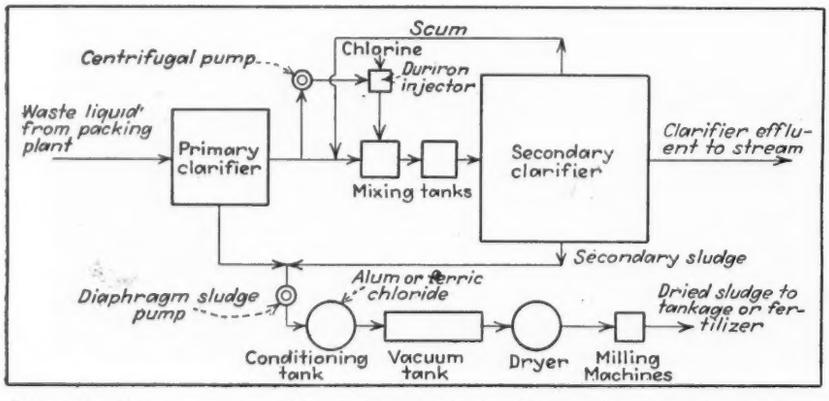
BUT PLANS ARE IN HAND at the present time to prepare this sludge for fertilizer at a total cost of $12 a ton, dry. The present market value of this material runs from $35 to $40 a ton, making possible a profit margin on the entire sewage treating process.

When the cost of the chlorine-precipitation method is compared with the expense of other systems for treating sewage, the true economy of former becomes evident. For example, treatment by biological methods would cost from $125 to $200 per 1,000,000 gal., which represents net cost because there is no protein recovery.

Inasmuch as it is the function of this sewage treatment to eliminate contamination of the stream, some may wonder about the amount of available chlorine discharged with the effluent. It happens that the amount of available chlorine is directly dependent upon the amount of nitrogen not precipitated by the chemical. And if a reasonable balance is maintained between the chlorine injected and the nitrogen, there are no objectionable results. Samples taken a few hundred feet downstream from the point where Hormel's plant discharges effluent showed a chlorine concentration not to exceed 0.06 p.p.m.

This concentration is anything but undesirable, because it prevents septic action and unsightly bacteriological growths in the stream. And it brings about desirable changes in domestic sewage if mixed with it. If mixed with raw domestic sewage, it would aid in controlling odors, preventing septic action and lowering the B.O.D. of the sewage. As for its effect on fish in a stream, chlorine treated sewage is favorable. When Hormel put its sewage plant into operation, there were no fish in Red Cedar River. But after a few months, the water had cleared up and fish appeared in it. After eight months, the stream was remarkably clear, the bottom being visible at a depth of 4 or 5 ft.

Treatment by the chlorine method is easily controlled, dependable and effects a greater reduction in B.O.D. than is obtained by mere removal of the nitrogeneous compounds. The method produces an effluent containing available chlorine to stabilize and delay decomposition. Against the advantages, and the factor of low cost, is one possible disadvantage. This is the toxicity of recovered materials for animals unless the fats are extracted. And that is of no consequence unless the materials are to be fed to animals.



Schematic diagram of the Hormel sewage plant. Shown also is equipment for dewatering the recovered sludge and converting it to fertilizer.

** B.O.D. is a quantitative measure of the oxygen required to stabilize organic matter undergoing decomposition. Material with a high B.O.D. quickly absorbs the dissolved oxygen normally present in a stream. Without oxygen, fish die and odors may result from the formation of certain chemical byproducts such as hydrogen sulphide.*

Insect Infestation Controlled By *High Temperature Treatment*

DATA ON HIGH TEMPERATURE TREATMENT of flour to control insect infestation are available in Technical Bulletin No. 107 of the University of Minnesota. The studies reported in this bulletin were made by M. J. Osthuizen of the Division of Entomology and Economic Zoology and were confined to the confused flour beetle, *Tribolium confusum* Duval. It is the dominant pest of the flour milling industry in many regions.

Use of high temperatures has long been recognized as an effective means of controlling insect infestation of stored food materials. In practice, however, the method has not had very general usage. Not many food materials can be stored at relatively high temperatures without damage. Also, heretofore, little was known about the results obtainable at different temperature and humidity levels or at what stage of development the insects are most susceptible to the destructive action of the heat treatment.

Widest use of the method has probably been in the flour milling industry because flour is one of the food materials which will stand heating to temperatures above 100 deg. F. without damage. Also, the treatment can be used to keep the production part of the mill as well as the stored flour free from the beetle infestation.

Experienced men in the milling industry know that the confused flour beetle thrives at temperatures of about 90 deg. F. They also know that unnecessarily high temperatures make the treatment more expensive than need be and that the amount of moisture in the heated air has an influence on its effectiveness as well as on the degree of damage likely to be done to the flour.

The studies were made to determine the effect of various temperatures on the death rate of different stages of development of the beetle and on the fertility and reproductive ability of the adults.

The tests were carried out so as to have the confused flour beetle in all stages of development from the egg to the adult forms subjected to temperatures of about 100, 105, 111 and 115 deg. F. and relative humidities ranging from zero to 100 per cent.

Beetles in various stages of maturity were obtained in vigorous condition by growing them in a special grade of whole wheat flour. Separation of the various forms was assured by having the flour ground so fine that about 95 per cent of the bran content passed through the bolting cloth sieves used to separate the eggs from the flour. After known numbers of the eggs, larvae, pupae and adults had been subjected to the various temperature, time, and humidity conditions they were returned to sterile flour and kept at the optimum temperature of 89.6 deg. F. with daily observations to determine the percentage of kill obtained by each test. Control tests were also run.

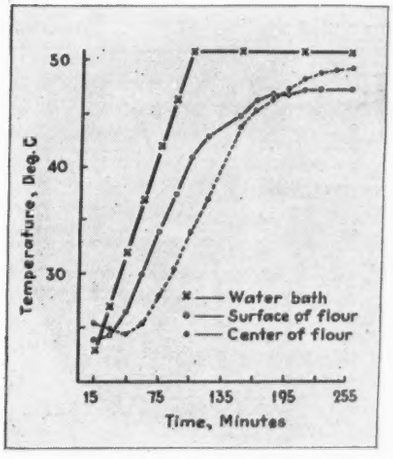
The percentage of mortality in exposed eggs, larvae and pupae was calculated according to the formula $\frac{x - y\,(100)}{x}$. X is the number of survivals in the control lot. Y is the number of survivals in the exposed lot. There was no mortality of adults of the confused flour beetle in a control lot from a vigorous culture of medium age.

A summary of the results obtained give bases for the following conclusions: 1. Eggs of the confused flour beetle are killed in less than three days at 105 deg. F. at atmospheric humidity. Even at a temperature no higher than 100 deg. F. there is a considerable reduction in the percentage of eggs that will hatch in comparison with those kept at 90 deg. F. 2. The pupa stage of maturity is most resistant to heat. 3. Dry heat is more effective in killing

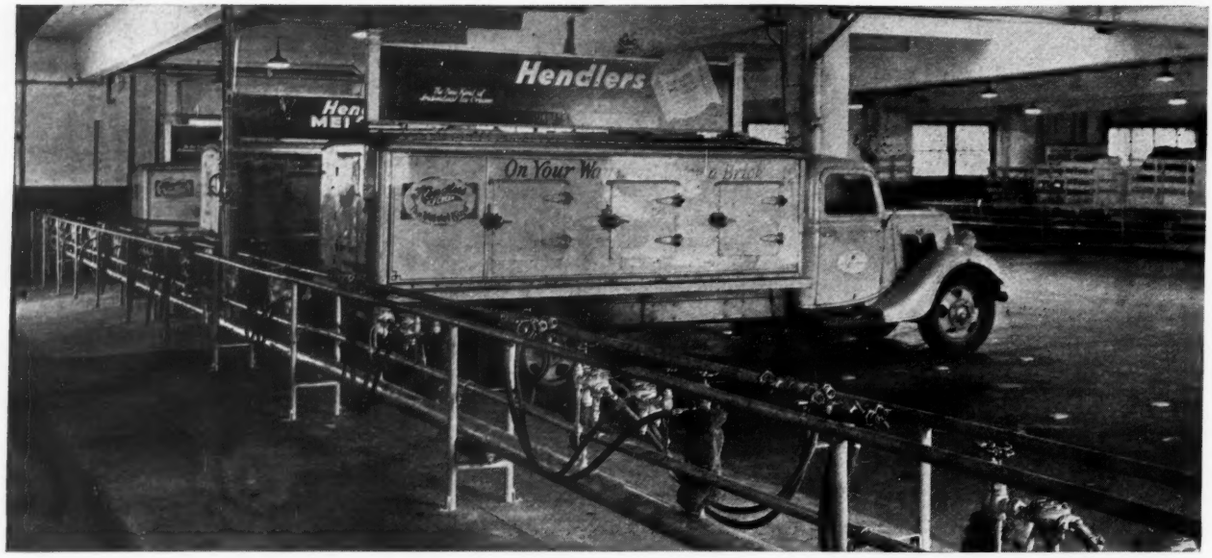
(*Turn to page* 173)

Temperatures higher than 100 deg. F. are used in flour mills and flour storage rooms to destroy insect pests common to flours. Information contained in this article will be of interest to manufacturers of

Bakery products
Breakfast cereals
Bulk flours
Chocolate and Cocoa products
Nut products
Packaged flours



In controlling insect infestation by means of heat it must be remembered that transfer of heat to the center of a mass of flour is so slow that the temperature in the center of 150 grams of flour is still at least 2 deg. F. below the temperature of a water bath 2½ hr. after the bath has reached a constant temperature level of 51 deg. C. (123.8 deg. F.)



Three of 48 Hendler ice cream trucks equipped with freeze plates lined up in their Baltimore, Md., garage, with their plates being frozen by ammonia from the central refrigerating plant. The trucks back up on both sides of the supply line. The two top pipes form a railing to protect the equipment. The next pipe below is the liquid ammonia line and the larger bottom pipe is the suction lines. Both were insulated later. The hoses connect lines to each truck.

FREEZE PLATES *Reduce Cost* In Ice Cream Distribution

FREEZE PLATES REDUCE THE COST OF ICE CREAM DISTRIBUTION. This reduction comes in the lower cost of refrigeration in the bodies of the delivery trucks employed. Some form of refrigeration is necessary in order to keep the ice cream in proper condition.

This refrigeration becomes of more and more importance as the size of the load and the radius of delivery is increased to provide a greater sales volume with its resulting economies. The greater the delivery area, the greater the amount of refrigeration required. The greater the refrigeration required, the greater is its cost.

Hence any reduction in the cost of that refrigeration lessens the cost of distribution. This in turn increases profits. And here is where the freeze plates play their part since they lower the cost of truck refrigeration as compared with other means.

A freeze plate is a rectangular slab from 2 to 3 in. thick and of any given width and length. When made up in one section to form the ceiling of a delivery truck, the plate may be 6 ft. wide and 10 or 12 ft. long. When made in smaller units for individual compartments in the truck body, the plates vary in size from 1½ to 2½ ft. in width to 3 or 4 ft. in length.

The outside surfaces of the plate are made of thin sheet steel, cadmium plated on their exterior areas, to give the box-like structure rigidity and inclose its contents. These include a continuous coil of steel tubing with inlet and outlet fittings attached to convenient points of the outer casing. Another type of plate has a continuously formed section welded together and providing a passage for the refrigerant instead of using pipe coils.

When a coil is used, it is surrounded with an eutectic compound. This compound is either a liquid or a heavy gelatinous substance. Both are compounded from certain salts and water and are basically the same except for viscosity.

The plate is fully constructed in all details, including the coils. It is then filled through an opening with the eutectic mixture. Allowance is made in the construction and filling of the plate for the expansion of its contents upon freezing or else the plate would be ruptured.

With the plate thus completed, the next step is to insert it in the truck body in which the ice cream is to be carried. Then some refrigerating medium is passed through the coil or passages in plate, going in at one connection and coming out at the other.

In circulating the refrigerating medium through the coil, two things are accomplished. First it changes the compound from a liquid or jell to a

frozen solid. Then, the continued flow of the refrigerating medium through the coil reduces the temperature of the eutectic still lower. This produces a lower temperature in the body than the freezing point of the compound itself.

Thus when the freeze plate begins to function by absorbing heat from the ice cream compartment, it gives up first its specific heat and then its latent heat. The available specific heat is of minor importance compared with the latent heat, the latter having a ratio of about 100 to 1 in heat capacity.

This latent heat is the most important advantage of the freeze plate since it serves as a reservoir which does not exist with other cooling systems such as solidified carbon dioxide, mechanical refrigeration using methyl chloride, Freon, ammonia and such gases directly expanded into exposed coils.

At the time of the first experimentation with the freeze plate for delivery trucks, most vehicles used solidified carbon dioxide as a refrigerant. The bodies were generally of the two and three-compartment type with hatches in the roof for the refrigerant.

In seeking to find a means of reducing the cost of refrigeration as compared with solidified carbon dioxide, the first freeze plate was made of a copper shell with copper tubing. It was made in one large plate and covered an area almost as large as the inside roof of all three compartments. The plate was spaced about 3 in. from the ceiling proper of the truck body. This made both top and bottom surfaces effective.

BRINE WAS THE CIRCULATING MEDIUM. This was piped from the main refrigerating system of the ice cream plant to a point in the garage at which the trucks backed up at night. Then an attendant connected intake and outlet hoses from the plant brine system to the corresponding fittings on each truck's freeze plate. The brine was circulated until the temperature of each plate was such that it would keep the ice cream in the compartments at the same temperature range as if solidified carbon dioxide were used. Other installations used various refrigerants which were expanded directly.

In some of the first freeze-plate trucks the solidified carbon dioxide hatches were retained in the large plate, with the bottoms of the hatches level with the bottom of the plate. This provided dual means of refrigeration.

In case the truck was transferred from the main plant to a branch where the low temperature brine was not available, but where solidified carbon dioxide was provided, the latter was used in the hatches to give uninterrupted service.

Due to the fact that the brine was available and could be piped to the truck garage at comparatively little expense, the cost of refrigeration on the first freeze-plate truck was reduced more than 50 per cent as compared with solidified carbon dioxide.

In the course of development, the brine piping was extended to take care of all of the trucks at the first plant and the freeze plates installed in the trucks.

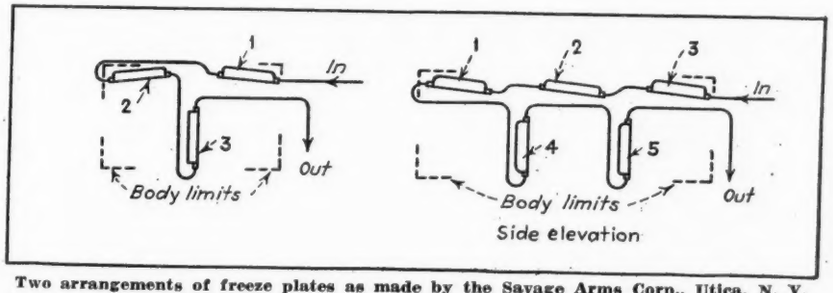
At other plants the trucks were equipped with the smaller type of freeze plates. In these plants, however, the plates are frozen by means of ammonia furnished by the plants' ammonia refrigeration systems. On each truck, an expansion valve was fitted on the piping where most convenient for connection to the plates.

IF AMMONIA COMPRESSORS have to be bought simply to serve the trucks and licensed engineers employed, resulting savings are naturally reduced. Savings depend on the difference between the cost of installing the complete freeze-plate system and the cost of solidified carbon dioxide.

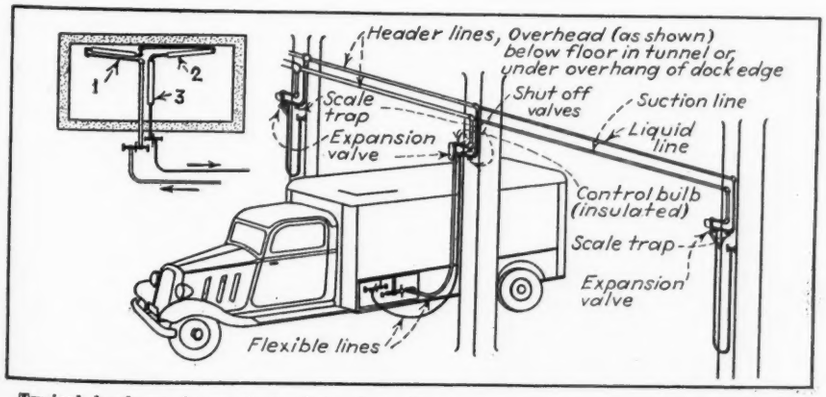
Further development in the design of the freeze plates has led away from one large plate to smaller units. These are easier to handle and permit installation in the compartment ceilings and division walls such as shown in the illustration.

The smaller plates cost from $50 to $75 each according to type and size. They may be procured from at least three manufacturers. In the latest truck bodies with freeze plates, the hatches are eliminated. This gives an unobstructed truck roof.

Other adaptations of the freeze-plate idea include the use of methyl chloride and Freon as refrigerating mediums through the use of expansion valves and compressors either on the trucks or in the plants from which they operate.



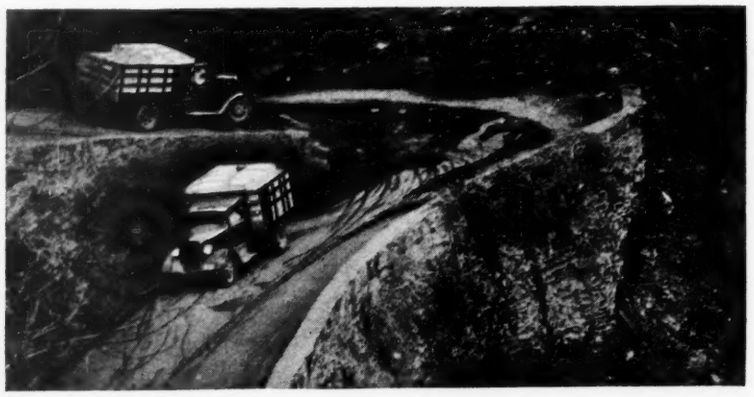
Two arrangements of freeze plates as made by the Savage Arms Corp., Utica, N. Y. That at the left has three plates, two horizontal and one vertical, for a two-compartment body, with the vertical plate in the division wall between the compartments. This arrangement serves for ammonia or methyl refrigerant. The arrangement at the right, for ammonia only, has five plates, three horizontal and two vertical for a three-compartment body.



Typical hook-up for a fleet of trucks with freeze plates as manufactured by the Kold-Hold Mfg. Co., Lansing, Mich. The Kold-Hold plates are brine filled and in the installation above are frozen by ammonia from the main plant system. At the upper left is a diagrammatic arrangement of a three-plate unit that has been designed for a two-compartment body.

The Truck's Place Is On The Road

How to keep it there



MANUFACTURERS LOSE MONEY when their distribution vehicles stand idle, just as they do when their plants are not in production. They carry fixed charges and depreciation losses on the equipment without getting anything from it in return. So efficient management sees to it that every truck of its fleet is in service as much as possible.

Various measures taken to reduce to a minimum the amount of time during which trucks are out of service are discussed below by men who operate truck fleets in the food industries.

Reduces Tie-Ups 50 Per Cent

The only method we have of reducing time-out in our truck service is a method of preventive maintenance, which we have now been using for about five months.

This system employs the use of instruction sheets which are sent out to our garage each 1,000 miles that the truck runs. By this means, we are able to catch minor troubles which, if let go, would no doubt result in costly delays on the road or in major mechanical jobs. The latter would cause the truck to be held in our shop for a long period of time.

Since this system has been in effect, we have been able to reduce our truck tie-ups by about 50 per cent.—A. E. SINCLAIR, *Kingan & Co., Indianapolis, Ind.*

Drivers Take Care of Trucks

There are, indeed, a good many things to be taken into consideration when dealing with the problem of time-out in truck service. I believe the most important factor in reducing our time-out service is our educational program. I have talked personally with each individual driver, explaining in detail the cost, trouble and annoyance of having trucks laid up for one reason or another.

Each employee who drives any motor vehicle for us is instructed to report immediately to the garage mechanic any trouble he has, regardless of how small it may be. This method prevents a small repair job from becoming a major one, as it would if not attended to at the start. All of our drivers have responded splendidly. Not only do they take care of the truck that is assigned to them but they are as a whole very careful drivers.

We have fifteen trucks. Twelve of these are driven daily by our routemen, two are used daily for special delivery work and the other (a spare truck) is used almost daily by one of our collectors or solicitors when it is not being used by a routeman.

Another important factor to be considered is the kind or type of truck used, especially in the retail milk business where a driver has to start and stop on an average of 150 to 200 times a day.

A tally sheet is made up every day showing the company and route number of the truck, the mileage of each truck and the total amount of gas and oil added daily to each truck. In the "remarks" column of this sheet, the reason is stated as to why a truck is laid up: namely, "accident," "paint shop," or whatever the reason is. The garage mechanic also has a daily "shop report" to fill out on each truck. This report covers all the work done on each truck, together with the parts used and the total hours spent on each job. If a truck is sent out, this is marked under the column "outside labor," and the reason is put under "remarks."

The hearty cooperation we receive from our drivers in reporting immediately minor troubles with their respective trucks has been most instrumental in keeping our trucks running.—A. C. DERSCH, *Korts Dairy, Rochester, N. Y.*

Loads Trucks at Night

Our principal problem in reducing time-out in truck service is to get our trucks loaded in the morning and away from the plant.

In our business, we have two classes of loads: those to be peddled to the retail stores, and freight. We endeavor to deliver all freight on the day the orders are received. Our salesmen bring in their orders in the evening for delivery during the next day.

In order to get the trucks out promptly in the morning, we load them at night with short-haul deliveries. And by the time they have returned from these deliveries, the necessary billing has been done on the freight and peddling loads so that there is very little time lost in keeping trucks on the road.

As for time-out due to mechanical repairs, body painting and the like, we have one truck without driver that replaces trucks in service when it is necessary to repair them.

We have no specific forms for keeping a record of this time-out, but our traffic head is in touch with the situation and follows closely all trucks out of service to see that they are returned as promptly as possible.—L. O. HASKINS, *Sales Manager, Hampton Cracker Co., Louisville, Ky.*

Distribution QUESTIONS CLUB

PROPER CLEANLINESS

The First Step in Quality Control

CLEANLINESS is a term that has many meanings. It all depends on the point of view. The kind of good clean-up job done by a street sweeper would never be tolerated by a housewife in her own home. On the other hand, a housewife's best job of dishwashing would not be satisfactory in a chemical laboratory where accurate volumetric analyses were being made because the glass ware would not be chemically clean.

Yet the chemist's method of perfect cleaning would not often leave the glass equipment in a satisfactory condition for the bacteriologist. The equipment might be chemically clean but not bacteriologically clean. It would need to be sterilized.

Bacteriologist's Idea Right

From the street sweeper to the bacteriologist the distance covered is a long one. Foods are preserved or kept from spoiling by strictly following bacteriological methods but, alas, most of the work has to be carried out by men (and sometimes women) whose notion of what constitutes cleanliness is often on a par with that of the street sweeper.

A tremendous job of education of the employees needs to be done in a great many food plants. People who are not properly informed cannot be expected to perform properly. They cannot even understand what it is all about. The average workman from the humblest walks of life may be willing enough, he may be adaptable enough, he may be intelligent enough to be trained into a valuable man. But if he should possess a street sweeper's notions of cleanliness he must be taught something different. Otherwise he retains his old ideas—ideas that usually work against good quality control.

Well, who is going to teach him? Foremen? This query raises another. Are the foremen always properly instructed in the fine points of cleanliness? Too often they are not. Superintendents? They ought to know all about it. Sometimes they do, but too often even superintendents don't understand. Sometimes they won't understand. And sometimes when they do understand, the management fails to back them up by providing adequate facilities.

All this talk about proper cleanliness is not a visionary scheme. Sometimes it has to do with the public health but in this discussion it is nothing but a commonsense step in good quality control. At times proper cleanliness has to do with the prevention of spoilage. More often it has to do with preventing quality from slipping down one or two notches through discoloration, off flavors and the like. A real dollars-and-cents value can be assigned to the proper kind of cleanliness.

Lest You Forgot

Many problems are involved in putting plant employees in uniform and in keeping the uniforms clean and in repair. Then there is the important matter of cost versus advantages. All this is covered, and actual plant practices are cited, in the article, "What Experiences Teaches About Uniforms," Food Industries, December, 1932, page 399.

Hitch-Hiking Bacteria Should Be Stopped

In every branch of the food business where wet materials are used the problem of bacterial cleanliness is very important. Bacteria are very tiny creatures. Often times, 25,000 of them laid end to end will make only an inch. They are notorious "hitch-hikers." They travel from place to place in amazing numbers by hitch-hiking on tools, equipment, pans, trucks, frocks, aprons, uniforms, tables, food, door knobs, door push-plates, handles, wiping cloths, gloves and human hands.

When a plant wants to be really clean and avoid the small losses of quality that invariably arise from infections by hitch-hiking bacteria, it is absolutely necessary that the management should be thoroughly sold on the idea. And they must be prepared to spend a little money to attain the ideal conditions—or else quality control will be only "so-so." It may not be even that good.

Personal Cleanliness Important

One important step in attaining the proper cleanliness is to require every employee to have clean hands and clean uniforms, clean gloves and clean aprons, clean wiping cloths and clean equipment. This is the way to stop hitch-hiking by bacteria.

Now what does such a condition involve? Some people and companies seem to hold to the absurd notion that clean uniforms issued on Monday morning do not get dirty—well, not very dirty—until Saturday morning. Or, that having washed one's hands with soap and water, that pair of hands is clean until quitting time. As a matter of fact, the "clean" pair of hands may be seriously contaminated in the next five minutes by turning a door knob, by pushing a truck out of the way, or by touching one's own soiled uniform or apron.

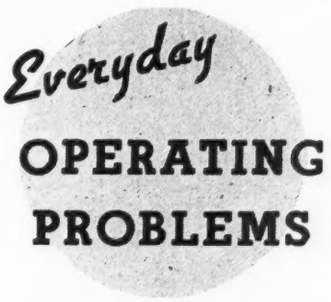
Change Uniforms Oftener

To lay down a hard and fast rule about how often to change uniforms is not easy. A lot depends on the type of plant or the character of the work. But it is safe to say that aprons and uniforms are not changed often enough, nor are hands washed often enough.

In one important line of food manufacturing where the dollars-and-cents value of cleanliness is highest of all food industries, the custom is to change uniforms, overalls and aprons only once or twice a week. This, in the face of the fact that competent scientific authorities in the field agree that fresh clean uniforms *twice a day* would be a proper and economic investment; that this move plus hourly sterilization of door knobs, truck handles, push plates, etc. would eliminate at one sweep many of its severest problems of quality control.

Management's Responsibility

Management has an obligation to understand these phases of quality control, to evaluate the cost and the benefits and then to formulate and act on a sensible program.



STEAM STORAGE
Meets Peak Demands

STEAM BOILERS are not designed to meet the wide fluctuations in load usually encountered in food processing plants, partly because of limited thermal storage capacity and partly because of time lag in the adjustment of the firing equipment. To meet the conditions, some other means must be adopted to take care of the variations in steam demand and to build up a reserve of thermal energy, instantaneously available for the service of the manufacturing plant. This is the function of the steam accumulator.

By storing the surplus steam generated during periods of low load and giving this out during periods of peak load, the steam accumulator enables the steam-raising equipment to operate at a continuous rating corresponding to the average demand of the manufacturing plant. Apart from this, it maintains a constant pressure both on the high-pressure and low-pressure steam mains between which it is connected, thus assuring a supply of steam to the processing plant at an absolutely constant pressure and temperature—an extremely useful function in all industrial operations, particularly those employing delicate chemical and physical processes.

The use of high-pressure boilers with back-pressure turbines represents an ideal combination from the thermal efficiency point of view. The disadvantage of such a system is, however, that the proportion of steam required for power and for process varies considerably, while all the difficulties of the industrial steam plant are accentuated by the restricted water capacity of the high-pressure boiler. If, however, a steam accumulator is installed between the turbine and the process plant, this supplies the necessary thermal storage capacity to take care of any difference in demand between power and process. By-product power obtained in this manner costs only about 25 per cent of that generated in condensing turbines, a fact of vital importance in many industries.

One of the most popular types of heat accumulator employed in the food industries is the Ruths. Details of an installation in a sugar refinery are given, in which one of these accumulators is installed. This can be taken as typical of a certain class of demand

which can be dealt with most advantageously by means of heat accumulators in conjunction with back-pressure turbines.

Fig. 1 shows the steam-demand curve obtained during a typical working day. It will be seen that although the average demand is 128,000 lb. of steam per hour, the peak demand reaches 190,000 lb. per hour and at other times only 60,000 lb. per hour are required. Theoretically, the curve representing the steam generated by the boilers should coincide with the curve in Fig. 1. Actually, this is impossible. Consequently, at certain times the steam consuming equipment is starved for steam, while at other times too much is generated, resulting in excess steam being blown off at the safety valves. There is also a time-lag between the demand and supply of steam. The Lancashire type of boiler has continued in use in England owing to its accumulative capacity, necessarily limited, provided by the water space. Modern practice is to adopt higher pressures by using the more efficient water-tube boiler, but the decreased water-space almost eliminates the heat storage capacity.

It is therefore essential to supply such capacity in a steam accumulator separated from, though working in conjunction with, the boilers. The latter would carry the average load only and would be arranged so as to run at approximately their normal full rating.

The peaks would now be supplied with steam fom the accumulator as shown in Fig. 1 by the shaded areas marked "accumulator discharging" above the average demand line. During the periods of small demand, areas marked "accumulator charging," excess steam would be stored in the accumulator to be given out again in the subsequent peaks.

Fig. 2 shows a Ruths steam accumulator in section. The accumulator, filled with water to 90 per cent of its capacity, is charged with steam admitted through non-return valve *E* to the internal main distribution pipe *F* and charging nozzles *G*, the circulating pipes *H* ensuring uniform and noiseless heating of the water. Steam is discharged through non-return valve *I* and a deLaval nozzle *K*, which in emergency (e.g. a rupture in the steam piping), automatically limits the maximum discharge of steam and prevents

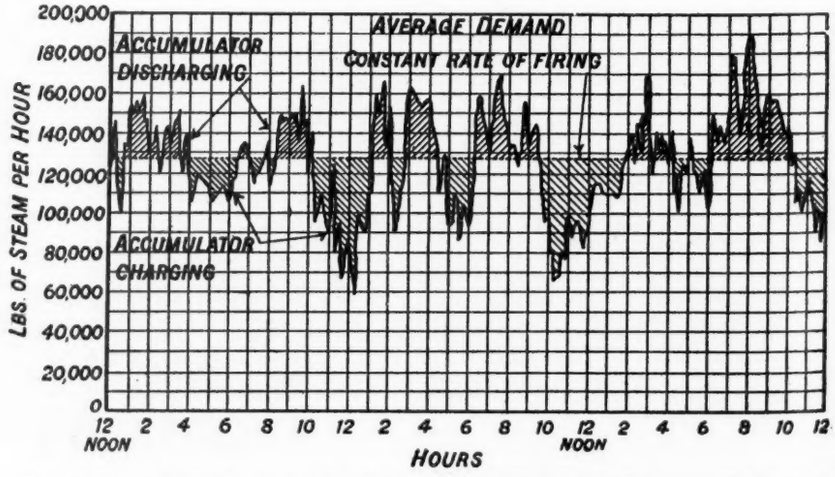


Fig. 1—Steam demand curve showing peaks supplied from the accumulator and valleys during which accumulator is charging.

priming. A water column L and feed valves are provided for reading and adjusting the water level in the accumulator.

The steam pipe N connects the boilers to the control valves and pipe P conveys the low pressure steam to the steam consumers, that is, the pans and evaporators in the case of a sugar refinery.

ALL STEAM in excess of that required by the high pressure consumers, such as steam turbines and hydro-extractors, flows through pipe N and control valve V_1 to the accumulator by pipe O. The low pressure consumers are connected to this pipe through control valve V_2. If at any moment more steam is passing V_1 than is required by the low-pressure consumers, the surplus is passed through pipe O into the accumulator, where it will condense and heat up the water.

When the steam demand from the low pressure consumers exceeds the supply of steam through valve V_1, the pressure in pipe O will fall, non-return valve E closes and I opens, allowing sufficient water to evaporate and pass out through nozzle K to assist the boilers in meeting the heavy load.

Thus the principle used is exceedingly simple and consists of storing, during slack periods, heat energy of steam in water under pressure at saturation temperature, and of releasing this energy during peak demands, in the form of steam produced by boiling under reduced pressure.

Fig. 3 shows the installation in the sugar refinery referred to. Process steam is required at 15 lb. per sq.in. for triple effect evaporators, heating, etc., and at 90 lb. per sq.in. for sugar pans. The demand for power is fairly constant at about 2,000 kw. The boilers are designed for 300 lb. per sq.in., and a superheat of 150 deg. F. Two 1,000 kw. non-condensing turbines equipped with speed governors expand the steam from 300 to 90 lb. per sq.in., at which pressure it is carried into process. A regulating valve V_1 is arranged to bypass for process all steam generated in excess of that required for the production of power.

The accumulator operates through a pressure range from 90 to 15 lb. per sq.in., having a storage capacity of 54,000 lb. of steam. It is connected to the steam system by means of the two regulating valves V_2 and V_3.

The sugar pans are connected both to the 90 lb. steam main and to an auxiliary line directly connected to the accumulator. The heating process is started with steam from the accumulator line and continued with the 90 lb. pressure. All the other steam consumers are connected to the 15 lb. steam main. The boilers generate only the average steam consumption of the refinery. All steam not expanded through the turbines is passed through regulating valve V_1, which acts as an overflow valve automatically maintaining the boiler pressure constant. The 90 lb. steam main receives the total steam output of the boilers either after passing through the turbines or valve V_1. Steam is supplied, as required, from the 90 lb. main to the sugar pans, the rest being automatically passed through the regulating valve V_2, which acts as an overflow valve for the 90 lb. main and maintains it at constant pressure. The reducing valve V_3 admits enough steam to the low-pressure main to maintain it at a pressure of 15 lb. per sq.in.

IF THE STEAM CONSUMPTION of the refinery equals the total average quantity of steam generated, an equal amount will pass through both regulating valves V_2 and V_3, and no steam will pass to or from the accumulator.

If a peak occurs in the 90 lb. main to the sugar pans, valve V_2 maintains the 90 lb. pressure, and the accumulator will supply sufficient steam through V_3 to maintain a constant pressure in the 15 lb. main. If the steam consumption in the 90 lb. line again decreases, V_2 will pass all excess steam from the 90 lb. main to the accumulator, variations in the consumption of 15 lb. steam are directly taken care of by a variable discharge from the accumulator through V_3, and all fluctuations, wherever they occur, are automatically met without interfering with the operation of turbines or boilerhouse.

In addition to the advantages enumerated later, obtained by installing an accumulator, the following additional benefits may be referred to in this particular instance.

Without an accumulator, during periods of low process steam consumption and high power demand, not enough process steam would be available to meet the power requirements if non-condensing turbines were employed, and it would be necessary to install bleeder turbines. This arrangement would necessitate the adoption of a turbine design capable of meeting a heavy power demand in the low-pressure stages. Not only would the ini-

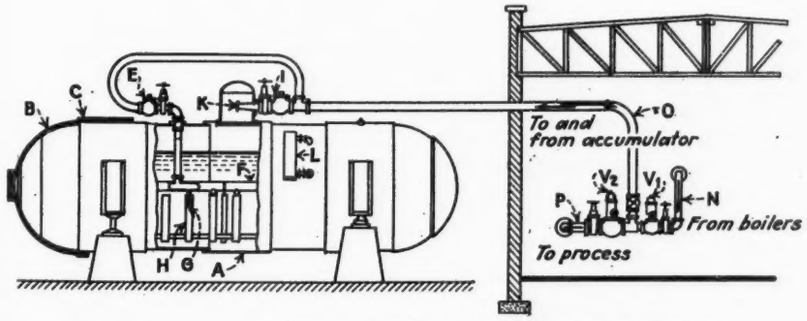


Fig. 2—Section of a steam accumulator, showing valve arrangement.

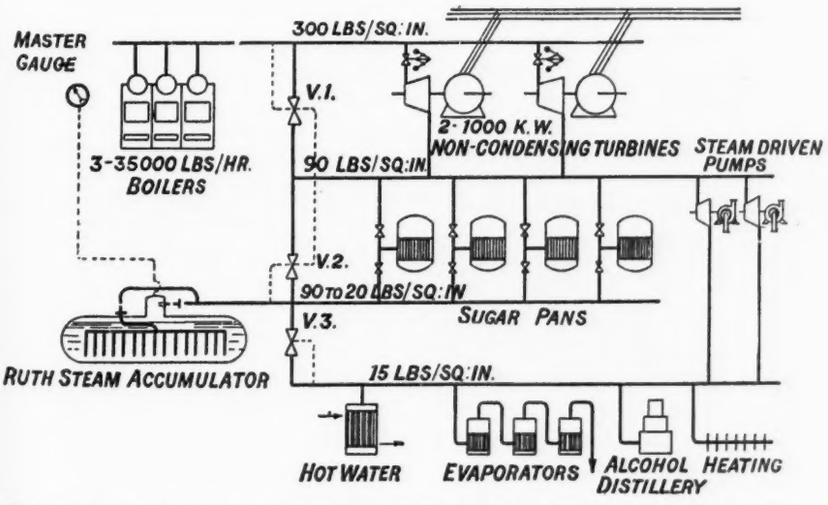


Fig. 3—Layout of steam piping in a sugar refinery showing location of steam accumulator in pipeline.

tial and operating cost of such a turbine, with condenser, circulating and condensate pumps, etc., be higher than that of a non-condensing turbine, but it would be more complicated.

With an accumulator, operating in conjunction with non-condensing turbines, any surplus exhaust steam available during periods of low steam demand is stored against peak loads on the process plant and, in this way, a balance is struck between power and process.

In conclusion, some of the main advantages of steam storage in general may be enumerated. (1) Increased production throughout the factory, due to instantly available steam supply and constant steam pressures and temperatures, which lead in many cases, depending on the nature of the product, to (2) improved quality of the product. (3) Smooth operation through the works as the boiler-house and process departments are independent of each other. (4) Both the capacity and efficiency of the boilers are increased as they can be operated continuously at full rating. (5) The number of boilers can be reduced as they are only required to meet the average steam demand and not the peaks. (6) Fuel is saved due to the provision of ideal steaming conditions and in many cases a cheaper quality can be used. (7) Maintenance costs are reduced as forcing of the boiler plant is eliminated.—C. H. S. TUPHOLME, *Farnham, England.*

Reconditioning Flooded Electrical Equipment

In a typical case where many industrial plants were flooded the following requirements were established:

All submerged wiring replaced with new materials except in the following cases: Rigid and flexible metallic conduits, metallic tubing and surface metal raceways had all wires withdrawn, the conduits thoroughly dried and new wiring installed except in short sections of vertical risers which were thoroughly dried and drained. Large installations which showed by test that this rule could be modified were also excepted. The following tests were required:

Conductors of 600 volts or less: cables and wire in conduit, at least 1 megohm to ground and between conductors, as shown by ohmmeter or megger.

Higher voltage conductors: At least 1 megohm for 1,000 volts.

Insulation resistance testing was done on isolated conductors to eliminate errors due to connected apparatus or other circuits.

On other types of wiring submerged armored cable was removed; all wood molding, wire in circular loom, open

cleat work, knob and tube wiring were replaced. All submerged fuses were discarded.

After a short period of air drying it is possible with alternating current generators to complete the drying operation by running the machine on short-circuit. It is only necessary to short circuit the conductors leaving the machine and to operate it slightly under normal speed. In some cases slow speed is required, but in either case the insulation is not stressed by the method and the drying process is improved because the heat is generated in the copper and travels outward in the windings. Temperatures should be taken every 30 minutes, also noting voltage and amperes and regulating the current. In no case should the current readings exceed 125 per cent of the machine rating. Current regulation can be had by varying the exciter voltage, adjusting the main field rheostat or both. If the latter is wet-saturated it can be dried out by leaving it in circuit. Insulation resistance readings should be taken every 4 hours until constant values have been obtained.

In drying out windings of a.c. and d.c. motors approximately full load current is passed through the coils. Induction motors can be dried out by passing current through the stator with the rotor blocked, using either alternating or direct current. No torque will be produced if one lead of a single phase a.c. or one lead of a d.c. supply is connected to one of the three-phase motor terminals and the other two motor leads are connected together to the other side of the supply circuit. On two-phase motors the windings can be connected in series.—H. S. KNOWLTON, *Boston, Mass.*

Stop sign protects truckers.

Flood-damaged Canned Goods

The following suggestions may be helpful in reconditioning canned foods that have been submerged in the floods.

Canned foods are sterilized in hermetically sealed impervious containers and consequently cannot be contaminated by exposure to water. Any contamination from exposure to flood waters would therefore be restricted to the outside of the can.

Under such circumstances the following treatment for stocks of canned foods which may have been in actual contact with flood waters is believed to be adequate to make the cans suitable for use:

(1) Remove labels and wash cans in warm, soapy water.
(2) Follow the cleansing treatment by immersion in a chlorine solution or other sterilizing solution approved by a Board of Health. Phenol, cresol or other coal tar disinfectants are unsuitable since the odor parted by such solutions is objectionable and persistent.
(3) Rinse the cans in fresh water and dry thoroughly to prevent rust.
(4) Repack in dry cases and store in a dry place as is usual.

If chlorine is used for a disinfectant, a solution having an alkaline reaction is recommended since such a solution tends to prevent rusting of the cans. If a solution of this type is used there is no need to rinse the cans in fresh water, but they should be dried promptly.

Advice regarding the strength of the sterilizing solution should be obtained from the local Board of Health or other agency concerned in the flood rehabilitation.

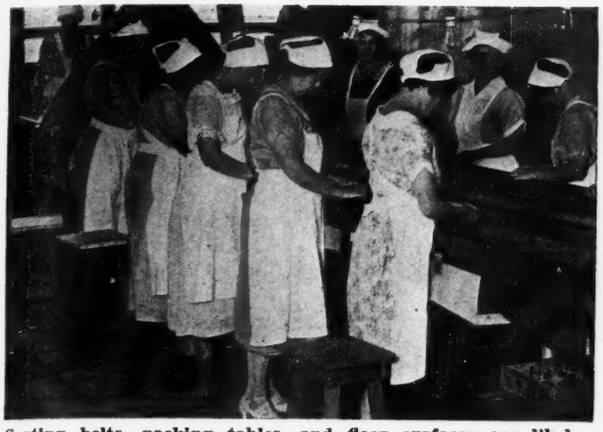
The cans may be relabeled as soon as they are thoroughly dry—*Source of information,* NATIONAL CANNERS ASSOCIATION.

Alley STOP Turns Danger Away

Safety for hand truckers passing from one building to another across a narrow alley traversed by trucks was a question brought to our attention by some narrow escapes.

Now the STOP sign, shown in the foreground (mouth of alley) of the accompanying photograph, is used. It was made with the cutting torch from 1 ft. of 6x6x$\frac{1}{2}$-in. angle iron. It is set in slots and lagged to the paving.

Use of this sign has effectively done away with the hazard that formerly existed.—GEORGE KELLEY, *El Paso, Texas.*



Sorting belts, packing tables, and floor surfaces are likely sources of mold and bacterial contamination of foods

SANITATION

How do you get it?

Believes Management and Supervision Most Important

WE DO NOT THINK THE MATERIAL from which equipment is made has much to do with sanitation. We believe that sanitation is up to the management and select a very careful superintendent, one who is neat, clean and orderly. He in turn selects help of the same kind. We then teach the help to be neat and clean, that they must not permit the equipment to become dirty, and that it is much easier to keep equipment clean than to be always cleaning up. After we have trained our help and found that they are careful, we constantly watch and never cease to preach care and cleanliness.

Materials used in connection with our products, pickles, are the most destructive agents on equipment in the food line. Salt and vinegar will eventually destroy almost anything. We have found that Allegheny metal is absolutely the only thing that will hold up under our products. Consequently, wherever the cost will permit, we use Allegheny metal. This practice applies to capping and filling machines especially. For bottle rests, the Allegheny metal lasts indefinitely, but all other metals are useless in six months.

We have tried floors made of various materials and find that salt and vinegar will destroy concrete so that the floor must be replaced every six months. We know that many claim a certain kind of mastic will hold, but we have not found it entirely successful and have concluded that oak wood is the very best floor if properly constructed.

For our hand-sorting belts we use the very best acid-proof white rubber belting and find these belts very satisfactory if thoroughly washed each time they are used.

For packing tables we have tried everything and find that a rubber surface is very good but because of its expense, we still use packing tables made of hardwood dressed down very carefully and have no trouble with them.

After trying every known cleanser, we have come to the conclusion that plenty of live steam, scalding water, and sal soda are the best cleaners that can be had. Our packing equipment is washed every day. The packing tables are steamed off with live steam, scrubbed with sal soda, and rinsed with scalding water.

With all the care we have taken with our equipment, we still feel that supervision has more to do with sanitation than any equipment or material that can be used.—W. G. WORMLEY, *White House Food Products, Harrisonburg, Va.*

Maintains Laboratory Control

Enclosed is one of our laboratory sanitation reports which will readily show how we have licked the sanitation problems in our plant. These reports are checked by our control laboratory every day and filed away with other records of that particular day's run of products. The sheets are tacked up in our cookrooms, sorting rooms, and other appropriate departments so that our employees know exactly what to do. We find that this practice has a moral effect on all of our employees because they know that all their cleaning operations are checked.

As to keeping down mold and bacterial growth on conveyor belts and similar equipment, we find that a Bakelite varnish on all exposed wooden surfaces not only prevents mold growth but also speeds up cleaning operations. We have also used this varnish on all rough metal surfaces where mold is likely to grow.

As to fabric conveyors which come in contact with food products, I believe this type of conveyor should be discarded wherever possible in the food industries and be supplanted with metallic conveyors. — ARTHUR E. SCHILLER, *E. Pritchard, Inc., Bridgeton, N. J.*

E. PRITCHARD INC.

LABORATORY SANITATION REPORT

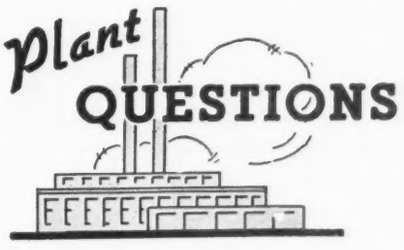
☐ Tomato Sorting Room	Inspect Sorting Tables Conveyor Flights Drains	
☐ Raw Tomato Lines	Should be rinsed hot every night with hot water, followed by hot water containing Wyandot or Oakite. If possible this should stand in pipe lines about 15 minutes. A cold water rinse should then follow. A cold water rinse in the morning is necessary before starting operation.	
☐ Cook Rooms	All valves should be flushed out Inspect Kettles Tanks Coils Floor	
☐ Finished Product Lines	Should be washed first with hot water followed by the Wyandot or Oakite solution. Allow to stand in lines at least 15 minutes. Rinse with cold water. Flush with hot water before operations in morning.	
☐ Fulgers, Fleishers and Extractors	Make sure they are taken apart each night and rinsed thoroughly with a steam hose	
☐ Filling Machines	Machines should be cleaned and rinsed first with wash solution in pipe line. Should be flushed with hot water and dismtd. Should be flushed with hot water before morning operation.	
☐ Personal of Employees	Report any unfair negligence or dirty habits.	
☐ Laboratory Samples	Samples should be taken at different intervals to check sanitation of lines and equipment and a report made on this sheet.	

Next Question

Use of uniforms for workers is becoming standard practice throughout food manufacturing. But questions are still being asked about how details of the practice should be handled. Some of the questions are:

1. Should the company or the worker pay for the uniform?
2. Should the company or the worker be responsible for the laundering?
3. Who should decide upon design of uniform and when or how often the uniform should be changed?
4. Should uniform regulations apply to men as well as women workers?

How do you take care of these details?



New DISCOVERIES AND INVENTIONS

Sorry—It's A Patented Method

AT THE REQUEST of The Diversey Corp., we remind our readers that the abstract on page 86, Feb. *F. I.*, "Easier way to Clean Equipment," covers a patented method. Says the company ". . . combinations of alkalis, with alkaline chromates, for use in the cleaning of tinned metal surfaces, are patented, and these patents are held by The Diversey Corporation." The patents referred to, Nos. 1,734,706 and 1,962,821, "have been twice sustained in litigation."

FATS AND OILS

Fat Spoilage from Microbial Causes

MANY CAUSES are ascribed to rancidity of fats: oxygen, light, positive catalysts (such as copper, iron, manganese, vanadium, chromium, nickel), Roentgen rays, electromagnetic rays, moisture and enzyme action. The last, enzymes, which arise largely from microbial growth (molds, yeasts and bacteria) are particularly difficult to investigate but a workable laboratory method has been devised.

To further confuse the problem of the study of rancidity there is no uniformity of terms used by research workers in describing the conditions observed. Acidity is often confused with rancidity, and many forms of fat splitting have proved to be difficult to name.

Purple discolorations of fats have been observed since long ago. Even Rembrandt (1606-1669) showed them in one of his paintings of a meat shop. In more recent times they have been sometimes called "stamping ink" discolorations when found on the fat side of pack-back hams. And years ago "labor troubles" were blamed for them. Yet they are now known to be caused by yellow-producing, harmless bacteria which grow well on solid fats at temperatures from 45 to 99 deg. F. The yellow pigment diffuses slowly into the fat and may later change into greenish or blue color through subsequent chemical and bacterial changes.

Pink discolorations are fairly common and operators finding them in their fat products should look to their processing methods and quality control rather than to suspect contamination from red labels or artificial sources of dyes. These pink spots are not poisonous. Often they are related to vitamin A. Pink yeast *(Torula)* and molds are the commonest causes of pink fats. Some *Torula* produce colorless substances which become deep red in the presence of dissolved iron.

Also bacteria which produce indol and skatol when growing on a nitrogenous-fat material will produce a pink pigment upon addition of nitrates. The latter may be an impurity in nitrate in the pickling solution.

Bacon fat held at 0 deg.F. may become rancid in anywhere from four to twelve months and there is always a definite connection between the numbers of bacteria on the original fat and its tendency toward rancidity at this temperature.

Digest from "The Action of Microorganisms on Fats," by L. B. Jensen and D. P. Grettie. Read at Indianapolis meeting of *Society of American Bacteriologists. Dec.*, 1936.

Renovating Rancid Oils

RANCID OILS are restored to an edible state, or fish oils, lard and various vegetable oils are refined, by a novel fermentation process in which an active culture of a yeast or a lactic-acid forming bacillus or some similar organism is brought into intimate contact with the oil under mildly oxidizing conditions. If the oil also needs bleaching, silica gel or active carbon may be used at the same time. The mild oxidizing agent may be air, or ozone if cautiously applied, or hydrogen peroxide. The culture of yeast or other microorganism is prepared with a fermentable sugar nutrient.

An example, as described in French Patent 797,099 (granted to Willy Ekhard, April 20, 1936), is the emulsification of 1,000 lb. whale oil with 100 lb. of a 3 per cent solution of a fermentable sugar which has been treated with 5 lb. of dry yeast. Air is passed into the mixture during emulsification to provide a mildly oxidizing environment. To the emulsion there are then added 2 lb. sodium sulphite and 0.5 lb. stannous chloride and fermentation is allowed to proceed for six hours at 86 deg. F. in a very active current of air. After the air current is stopped the emulsion settles. The water layer is drawn off and the refined oil is thoroughly washed to remove all traces of the yeast culture.

No Infallible Test For Virgin Olive Oil

OF ALL THE MANY TESTS for determining whether a sample of olive oil is virgin, none is infallible. And the natural antioxidant content of olive oil is so variable that it cannot be used as a test. Nor does it appear likely that virgin olive oil, defined upon its manner of manufacture rather than upon its physical and chemical properties, can be adequately estimated by any physical or chemical test.

Digest from "Methylene Blue Induction Period and Virginity of Olive Oils,' by Cunningham and Saywell. *Food Research*, 1, 457, 1936.

BAKERY PRODUCTS

Rats Probably Caused This Epidemic

THREE PERSONS DIED and 208 were made ill in an outbreak of food poisoning in Rhode Island in March, 1935. All of these people ate pastry filled with a "cooked cream" (chocolate eclairs) made in a small bakery in Providence. This bakery was in the rear of a shop that was formerly a stable. On one side was a private garage. A soap factory was across the alley on the other side. The alley contained "much human as well as rodent excreta." Inside the bakery nothing grossly out of ordinary was found.

The illnesses were caused by infec-

tion of the cream filling of the pastry by *Salmonella enteritidis*, but examination of utensils, containers, raw materials, and stools from employees failed to disclose the source of the infection. Apparently something happened to infect the filling while it was being cooled. "In the process of being cooled this preparation was kept in wooden buckets in a corner of the room close by the rear door with the exception of a short time during which they were moved out to the alley outside this door for further cooling. The buckets were only partially covered. Several large rat holes led directly into the yard from this corner. This little area of the room was further marked by accumulations of rat excreta. Accordingly traps were set and within 21 days two large brown rats (*Rattus norvegicus*) were caught in the same corner of the room."

In the intestines (colon) of one of these rats was found the same bacteria which caused the illnesses. Positive proof that the rats actually infected the fillings is lacking but the evidence points strongly in that direction. The following sentence is significant to food manufacturers: ". . . few if any rat populations are free of Salmonella infection, there being always a number of individuals (rats) harboring these organisms."

Digest from "An Outbreak of *Salmonella* Food Infection Caused by Filled Bakery Products," by Stall and Grover, Rhode Island Dept. of Public Health, *Food Research*, 1, 465, 1936.

Better Crust Color in Corn Sugar Breads

LACK OF COLOR IN CRUST has been the obstacle to the use of dextrose and maltose as sources of fermentable carbohydrates in bread making. In general practice the prized rich brown color has been obtained through the addition of cane sugar or malt extract.

As divulged in U. S. Patent No. 2,067,911 granted Jan. 19 this heightened color may be had through the addition of small quantities of urea to the dough batch in which dextrose or maltose are the fermentable sugars present. The urea can not act in itself. An activating agent is added to bring about the freeing of ammonia during fermentation, make-up operations and particularly baking.

A recommended procedure is to add ½ lb. urea and from ⅛ to ¼ lb. of ground soy bean to a dough batch made with 300 lb. of flour. Acidity of the dough is adjusted by the addition of mucic acid or mucic acid and calcium acid phosphate. If mucic acid alone is used, ¼ lb. is sufficient for the 300 lb. dough batch. But if both the acid and the phosphate are used, $\frac{1}{10}$ lb. of each is used.

When made in dry form with starch or flour as a filler the mixture of urea, ground soy bean, mucic acid and calcium acid phosphate will not deteriorate under commercial conditions of shipment and storage.

Patent is assigned to Standard Brands, Inc., by Charles N. Frey, Alfred S. Schultz, and Elmer B. Brown, New York, N. Y.

SUGAR

Preheater Tube Corrosion In Sugar Refineries

THE CORROSION of metal tubes in preheaters and other apparatus has been systematically investigated in a number of sugar refineries in Germany. The problem is complicated because both physical and chemical forces are exerted on the tubes from a variety of sources and in a variety of ways. In preheater tubes the attack is mainly chemical or electrochemical, with little or no erosion by suspended particles of impurities in the juice. Copper and brass (Cu-70), if free from mechanical defects, give good service and high grade special brasses or bronzes are not needed for these tubes.

For exposure to juice saturated with carbon dioxide and sulphur dioxide, two brasses, one containing chromium and the other containing nickel, have been found serviceable. Tests were made with a great variety of brasses, bronzes and special alloy steels. For testing the severity of attack the weight-loss method is preferred. The potentiometric method, which it is not reliable for estimating the weight relations involved in corrosion, is suitable for estimating corrosion hazards.

Digest from "Tube Corrosion in the Sugar Industry," by W. Kohler, *Korrosion und Metallschutz*, 12, 312. 1936.

DAIRY PRODUCTS

The Hofius Process for Preserving Dairy Products

THE HOFIUS PROCESS, which will keep liquid dairy products fresh for many days (as long as five weeks in favorable cases), depends on inhibiting bacterial activity without the necessity of pasteurizing. Whole milk, skim milk, butter cream and buttermilk may be stored in this way. The process consists essentially in degasifying the liquid, chilling to 56 deg. F. or lower, introducing oxygen in place of the gases which were expelled, and storing under at least eight atmospheres of oxygen pressure. Chemical tests show that no hydrogen peroxide is formed under these conditions.

If iron containers are used, milk and buttermilk will absorb traces of iron and so will contain a little more iron after storage than before. The safe storage period depends on the sensitivity of the product. With butter cream, for example, the time is governed by the effect on flavor. If objectionable flavor deterioration is permitted to occur it will persist in the butter. The storage temperature need not be kept below 56 deg. F., but may be somewhat higher, if the milk or other product is first pasteurized three hours at about 130 deg. F.

Digest from "The Hofius Process for Keeping Liquid Dairy Products Fresh," by Dr. Schwarz, *Angewandte Chemie*, 50, 39-40, 1937. (Published in Gemany.)

Aeration and Pressure for Better Flavor in Butter

A HIGH CONTENT OF DIACETYL is one of the important flavor characteristics of a satisfactory butter culture. Diacetyl is probably formed by oxidation of another substance, acetylmethylcarbinol. By cultivating the butter starter under a pressure of 30 lb. per sq.in. or more with simultaneous aeration, the production of the desirable flavor-producing diacetyl is definitely increased. Some times the increase amounts to 200 to 400 per cent.

Butter churned with such aerated pressure-cultures has a superior flavor, scoring about one point higher than control tests made in the ordinary manner. And the superiority persists after a month in storage at 0 deg. C.

Digest from "The Action of Air Under Pressure in the Oxidation of Acetylmethylcarbinol to Diacetyl in Butter Cultures," by Brewer, Michaelin, Werkman and Hammer. Read at Indianapolis meeting of *Society of American Bacteriologists*, Dec., 1936.

Churn Cleaning Methods

THE PERENNIAL PROBLEM of proper cleaning of wooden butter-churns is important because the score of the butter from the quality standpoint and its keeping quality are adversely affected by mold and yeast contamination. While these contaminations can arise elsewhere, the churn itself is one of the principal sources of infection.

Out of seventeen butter plants, seven produced low-count (mold and yeast) butter. Churn cleaning methods in these seven plants involved: ample wash water (⅓ to ½ capacity of churn) at 180 to 200 deg. F.; 0.1 to 0.2 per cent of washing powder solutions; rewash or rinse with alkaline hypochlorite (50 parts per million of chlorine) together with lots of hot water; long contact of hot water with revolving churn (minimum of fifteen minutes).

Steam sterilization is not satisfactory.

Digest from "Churn Cleaning Methods Used by Plants Producing Butter of Various Yeast and Mold Counts," by H. A. Bendixen. *Journal of Dairy Science*, 20, 15, 1937.

BEVERAGES

Air Filters for Beverage Manufacture

AIR FILTRATION IS NEEDED not only for the purpose of protecting food from spoilage but also in all heating and ventilating installations, in drying equipment and in the air cooling of electric and power generating machinery.

In bag filters of the suction type, the dusty air stream is directed through cloth bags in which the dust particles are retained. These need periodical cleaning. Mechanical devices designed for this purpose are not always satisfactory. The pressure type of this filter is simple in construction, but is not applicable where complete sterility of the air is required. The efficiency of cloth filters depends upon the structure of the fabric, the character of the dust, and the quantity, temperature and humidity of the air to be cleaned.

Cell filters, in which the air is forced through filter materials impregnated with a non-evaporating, dust binding, viscous liquid are the more efficient and suitable type of air filters. In rotating filters it is essential that the air always passes through the filter in the same direction.

Electrical air purification is far superior to other methods. Uniform air distribution and constant air velocity are required for best results. The vertical type of electric air filter is particularly suitable where only small space is available, for the removal of liquid particles, and for the filtration of air or gases at high temperatures. The electrodes should be grouped advantageously, partly serving as dust collectors and partly as receivers and conveyors of the clean air. Either pipes or plates form the percipitation electrodes. The accumulating dust must be removed at regular intervals. The electric method has the advantages of low energy consumption, practicability at all temperatures and the precipitation of all impurities in dry form.

Digest from "The Aeration of Wort by Means of Filtered Air," by O. T. Koritnig. *Schweizer Brauerei-Rundschau*, 47, 47, 1936. (Published in Switzerland.)

Wine Spoilage and Its Prevention

FORTIFIED SWEET WINES, containing 19-20 per cent alcohol, are usually considered immune to spoilage but in 1933 it was first discovered in California that they can spoil. The bottled wine develops a flocculent sediment that is unsightly but scarcely affects the taste. Dry wines are not affected. The cause is an organism that has been traced clear back into the winery to infected vats, shipping barrels and to tank cars.

Control of this deterioration of quality is possible in four ways: 1. use of 60 parts per million of sulphur dioxide; 2. add 0.5 grams citric acid per 100 cc of wine; 3. bring alcoholic content to 22 per cent, which is impractical; 4. pasteurize the wine by ordinary methods.

Digest from "Some Characteristics of an Organism Causing Spoilage in Fortified Sweet Wines," a paper read at Indianapolis meeting of *Society of American Bacteriologists*, December, 1936, by H. C. Douglas and L. S. McClung. Also abstracted in Journal of Bacteriology, Jan. 1937, p. 103.

CONFECTIONERY

Powdered Fudge

A POWDER FOR MAKING FUDGE simply by melting in hot water, without the necessity of creaming or graining, is described in British Patent 453,417 (granted Dec. 3, 1936 to R. W. Robinson and A. Olsen). A fudge is made up, with or without the usual fat content, and is dried and pulverized. If fat was omitted in the original fudge, it is added when the powder is melted with water to form the final fudge product.

In an example, a fudge is prepared from unsweetened condensed milk, corn syrup, sugar, butter or coconut fat and the desired flavoring. The batch is cooked at 235-255 deg. F., with constant stirring, then cooled in a beater (water-jacketed) to 90-120 deg. F., creamed and grained in the beater, heated again to 125-160 deg. F. and spread on pans to set.

Fondants can be made by stirring into such a batch a cooked, creamed fondant made from corn syrup, sugar and water. When dried and powdered, such a preparation can be remade into a fondant just as the fudge powder can be reconstituted, with hot water. With more water, powders made according to this invention yield good cake icings. By cooking with a slight excess of water a caramel candy is produced.

MACARONI PRODUCTS

How to Test Macaroni by Boiling

TESTS TO SHOW the behavior of alimentary pastes such as macaroni in boiling water were made by adding 10 per cent of macaroni to boiling water containing 1 per cent of salt, and boiling in a specially designed boiler until a paste was formed. For 23 samples which were tested, the required boiling time ranged from 9 to 17 minutes. Some samples absorbed as much as 2.7 times their weight of water, others as little as 1.3 times their weight. The volume increase was from about three to somewhat more than four times the original volume. In tests with noodles the resistance to decomposition was measured by the turbidity in the water in which the noodles were boiled.

If a more accurate estimate of decomposition is wanted, the water can be evaporated and the weight of dry residue can be determined. In this method the weight of salt in the dry residue must be subtracted. The losses as measured by this more accurate test ranged from 4.8 to 12.8 per cent. If the maker of alimentary pastes takes the trouble to test his product for boiling time, water absorption, swelling capacity and weight loss, he is in a good position to judge the qualify and faults of each type of product.

Digested from "Boiling Alimentary Pastes," by L. Borasio, Mühle 72, No. 35, *Mühlenlaboratorium* 6, 114. 1936. (Published in Germany.)

FRUITS AND VEGETABLES

Tank Agriculture Modified

THOSE WHO ARE INTERESTED in the Gericke method of tank agriculture (F.I., May, 1936, p. 218) will find information of value on a modification of the method, known as sub-irrigation, which is said to be suitable for large-scale production. Details of design of the equipment are given together with some information regarding the nutritive ingredients. But no production results are presented. This method apparently is not patented in any way.

See "A Sub-Irrigation Method of Suppyling Nutrient Solutions to Plants Growing under Commercial and Experimental Conditions," by Withrow and Biedel, *Journal of Agricultural Research*, 53, 693, 1936. (Published by U. S. Department of Agriculture.)

CANNED FOODS

Sterilize with the Channels Vertical

WHEN A PRODUCT in tin cans tends to develop definite channels through which the liquids may flow, it is important to place the cans in such a position during heat sterilization that the channels are vertical. Thus spinach, which tends to stratify in horizontal layers, should be processed with the can on its side, so that convection currents will give a more rapid heat penetration. It helps to avoid spoilage troubles, and is especially important in No. 10 cans.

On the other hand, asparagus spears should be processed with the cans vertical. Also asparagus-style string beans. But, with cut asparagus, cut string beans and peas, the position in the retort has little influence on heat penetration.

Digest from "The Processing of Stratified Products," a paper read by J. R. Esty at 1937 convention, *National Canners Association*, Chicago.

What's New IN EQUIPMENT

Deodorizing Food Trucks

A SMALL, PORTABLE OZONE GENERATOR made by Electroaire Corp., 1455 West Congress St., Chicago, Ill., is said to have been used successfully by National Tea Company for deodorizing and sterilizing food trucks.

With this device, the trucks are first swept out, and the floors are dampened by sprinkling. The ozone machine is then placed in the truck and the doors closed. When the treatment period is completed, the truck is ready for immediate service.

It is claimed that this method makes great savings in the cost and time of deodorizing and sterilizing trucks.

Food Handling Trucks

RECENT TRUCK MODELS developed by International Harvester Co., 606 So. Michigan Ave., Chicago, Ill., and suitable for use by food manufacturing and distributing companies are Model C-15 and Model C-300.

Model C-15 is a ¾ to 1-ton truck designed for handling bulky, light weight loads such as bakery products. It has a 78.5 brake horsepower engine of the six cylinder L-head type, and employs 7.00-16 balloon tires. Among the bodies available are a panel body, a canopy top express and an all-steel pick-up.

Model C-300 is a 1½-ton, cab over engine truck, adapted to bodies up to 15 ft. in length. Short wheelbase and wide tread front axle permit short turning radius, so that the truck is easy to maneuver in congested districts.

Carton Sealing Machine

FOR CLOSING AND SEALING WINDOW-TYPE PACKAGES of breakfast foods and similar dry food products, J. L. Ferguson Co., Joliet, Ill., have developed the "PT," or pocket type carton sealing machine.

In operation, the attendant places the carton on the machine. The machine works intermittently, sealing the bottom of the carton, carrying the carton to the filler where it receives the product automatically, and then closing and folding the top flaps, after which the carton is discharged into the compression units.

The first of these machines is in operation at the Tip Top Cereal Co., Albany, N. Y. It is handling a window-type carton, into which is inserted a transparent cellulose bag.

Explosion-Proof Mixer

PORTABLE MIXERS equipped with totally enclosed air jacketed motors, or with explosion proof air jacketed motors, are being supplied by Mixing Equipment Co., Rochester, N. Y. These mixers are for use where fumes or vapors must be kept away from the motor to prevent damage to motor, or explosion.

Small Colloid Mill

FACTORY PERFORMANCE ON A LABORATORY SCALE is claimed for the Gaulin Laboratory Colloid Mill, for which Chemical Publishing Co. of N. Y., Inc., are the sole distributors. This mill operates from a ½ hp. motor. The rotor speed is more than 10,000 peripheral ft. per min. It runs at constant speed, regardless of load, and maintains this speed unless excessively overloaded.

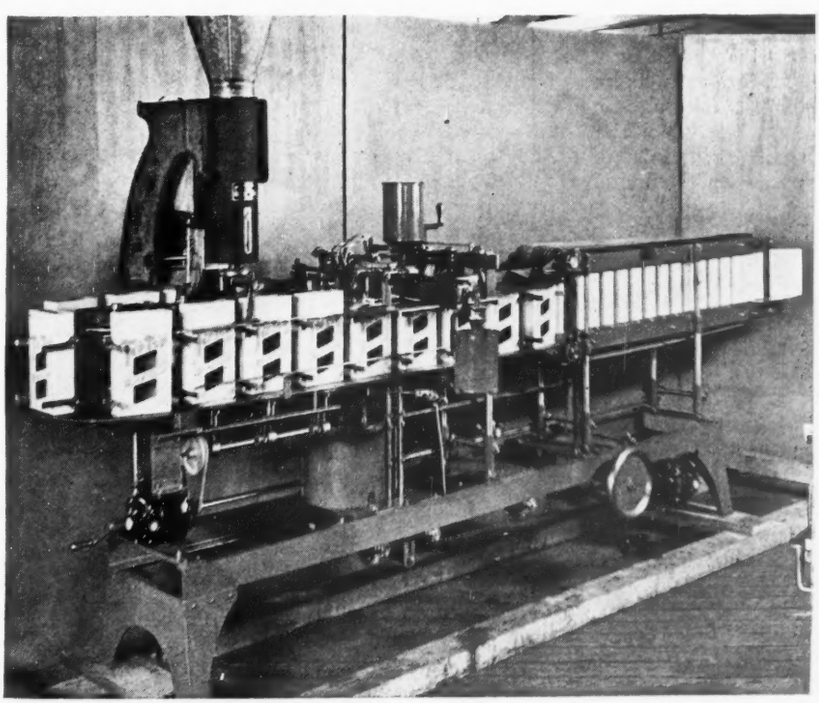
Features of the Gaulin mill are adjustable gap, water cooling, air release to remove air before operating so as to avoid foaming, non-seizing rotor, and ease of cleaning. Standard materials are stainless steel and bronze. Other metals may be substituted where desired at small extra cost.

Label Paster

SCIENTIFIC FILTER CO., 1 Franklin Sq., New York, N. Y., has developed the "Whirlwind" electric label paster. It is designed to handle all types of paper labels, light cardboard labels, and some types of cloth labels. It operates on extra light-bodied glues. The glue is applied to the label in light, narrow strips, cutting down the tendency to curl and allowing quick application with a minimum of mounting and no wrinkling.

Crushed Ice Slingers

ANNOUNCEMENT HAS BEEN MADE by Link-Belt Co., 307 North Michigan Ave., Chicago, Ill., of additions to its line of ice crusher-slingers for top-icing cars or trucks of vegetables, fish, milk and other foods with snow ice. These models are in three lines, either



Machine for filling, closing and sealing window-type cartons.

gasoline engine or electric motor drive, are as follows: Series 100, crushing and slinging capacity 7½ tons per hour, handling 25 lb. cakes; Series 200, crushing and slinging capacity 15 tons per hour, handling 50, 75 and 100 lb. cakes; Series 300, crushing and slinging capacity 30 tons per hour, handling 300 lb. or full size cakes.

High velocity discharge is a feature of these new machines, enabling the operator to ice all corners of the car or truck thoroughly without disturbing the center loading.

Unit Heater

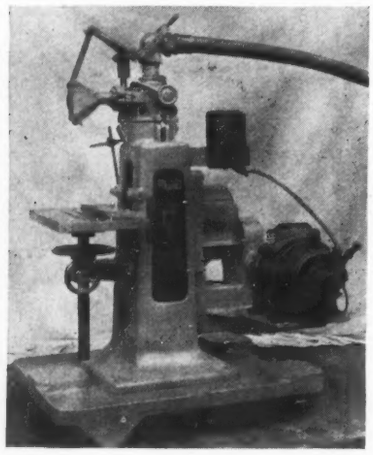
AN ALL ELECTRIC UNIT HEATER has been placed on the market by Hexcel Radiator Co., Racine, Wis. It has dual heat control, with high heat that can be used for heating up an area, and low heat for holding the temperature. Maximum B.t.u. output is 20,500. Minimum output is 11,950 B.t.u. Air output is 250 cu.ft. per min. The motor operates on 220 volts, 60 cycle, a.c.

Filling Machine

ACCURATE FILLING OF GLASS CONTAINERS of mayonnaise, honey, jellies, whole fruits and similar liquid or semi-liquid food products, is said to be accomplished with the new "Simplex" filling machine made by F. J. Stokes Machine Co., Tabor Road and Cedar Grove Station, Philadelphia, Pa.

With this machine, filling is accomplished by a piston and a three-way valve. The valve is of the dripless, "molasses-gate" type. Control is by foot pedal, or by contact with the empty container. The machine is portable, with an adjustable table and a direct motor drive. It may be equipped with hose feed or with a hopper.

Advantages claimed for this design include easy cleaning and change-over from one material to another. Capacity is adjustable, to fill 30 to 40 containers per minute, from 4 oz. to 1 qt. size.



Filling machine for glass containers

Protective Coating

MACHINERY, PROCESSING EQUIPMENT, AND STRUCTURES, whether of metal, wood, concrete or brick, are said to be protected from corrosion, moisture and other destructive factors by the use of "Coppercote." This material, made by American Coppercote, Inc., 480 Lexington Ave., New York, N. Y., is also said to be fire-resistant and long wearing. It is applied like a paint by brush, spray or immersion. It is not a paint, however, but is a suspension of fine particles of metallic copper in a vehicle which serves to bind them to the material which they cover.

Inspection Device

THE CLEVELAND UNION ENGINEERING Co., Cuyahoga and West 4th Sts., Cleveland, Ohio, has developed an inspection device for use in detecting leakers and spotting foreign material or other defects in the contents of beverage bottles or glass containers.

This equipment consists of a hooded light source and a reflector or "detector glass." The light produces amber rays suitable for inspection purposes. The reflector is a concave mirror, mounted in a rigidly supported brass frame and is adjustable for height and angle. It can also be swiveled to suit the inspector's convenience.

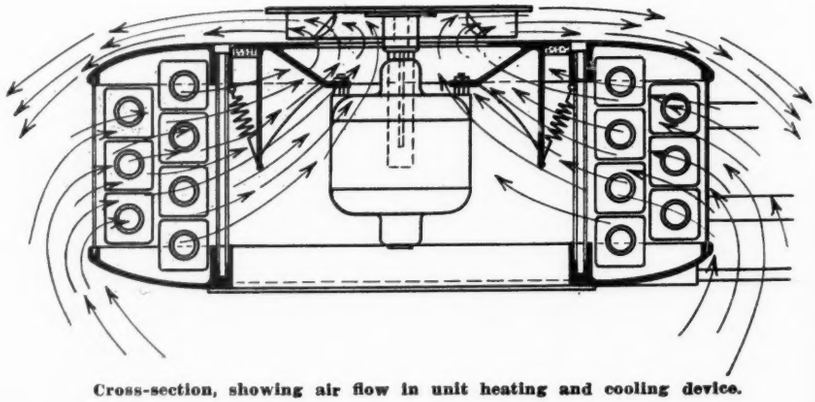
The equipment is also provided with a revolving disk or table, so that bottles are given a complete turn during inspection.

In operation, the detector is placed between the capping machine and the labeler. The inspector sits in front of the reflector in such a position that his eyes are on a level somewhat above the tops of the bottles. Enlarged images of the bottles can then be seen without interference from the passing row of bottles on the conveyor. Rejected containers are removed from the conveyor by hand.

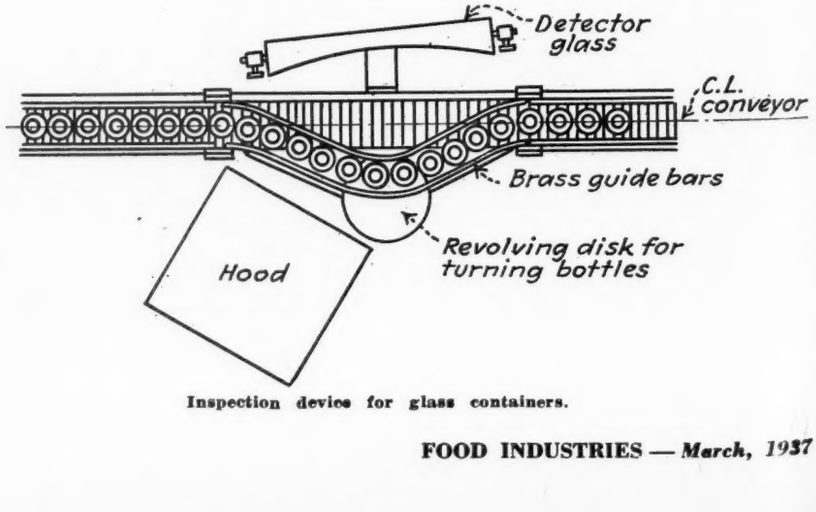
Heating and Cooling Device

ROOM HEATING OR COOLING, in industrial plants, stores or offices, can be effected by means of the "Thermodrum," a device put on by Tenney Engineering, Inc., Bloomfield, N. J. This device consists of a circular coil of several turns of finned tubing through which a heating or cooling medium is circulated. Centrally mounted in this coil, a motor-driven fan sucks air through the coil and discharges it over an umbrella shaped deflector plate which gives the air a downward and outward direction.

It is claimed that this device gives uniform mixture of air without stratification. In addition, as when used in the dough room of a bakery, the one unit can both cool in summer and heat in winter.



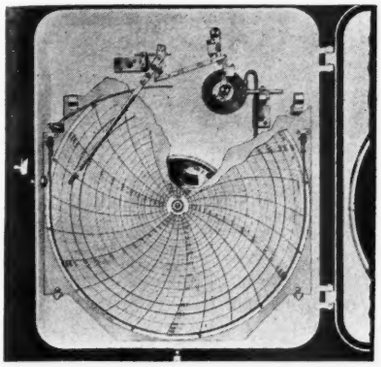
Cross-section, showing air flow in unit heating and cooling device.



Inspection device for glass containers.

Dairy Instruments

C. J. TAGLIABUE MFG. Co., Park & Nostrand Aves., Brooklyn, N. Y., are distributing a line of instruments designed for dairy applications. One of these is a temperature recorder for

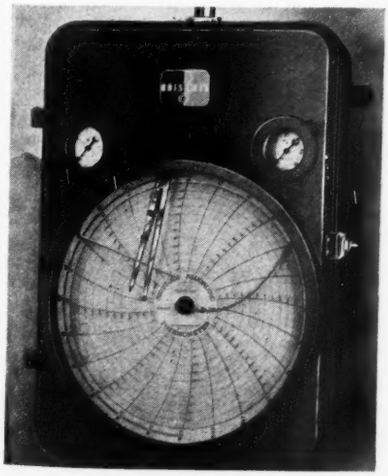


Dairy milk temperature recorder

milk, design of which provides a full sized 12 in. chart with 5¼ in. pen travel, and provides much wider single degree graduations in the pasteurizing range than are required by health authorities. Others in the line are a recording thermometer for cream, a general purpose recorder, an autostop milk pump controller, a double system indicating controller, and a recorder controller. In addition, there is a universal scale thermometer, indicating cooling, aging and pasteurizing temperatures on the same instrument.

Control Instruments

BRISTOL Co., Waterbury, Conn., has placed on the market a new line of controllers for temperature, time-tempera-



Control instruments for severe processing conditions

ture, flow, liquid level, pressure, time-pressure and humidity. These controllers are known as the "Master Free-Vane" line. They are for use in applications requiring greatly reduced sensitivity (wide throttling range) and where load conditions fluctuate over a wide range.

The instruments are of the pneumatic type. They are equipped with a sensitivity adjustment, an automatic reset, and accessory features to minimize hunting, prevent departure from the control setting, make it possible to reach a new control setting without overshooting, make it possible to adjust the anticipatory effect to fit the process lag, and make it possible to adjust the resetting mechanism to function in an amount proportional to the rate of change in the process.

Grain Trailer Body

BULK GRAIN AND PACKAGE FLOUR HAULING is the primary object of a trailer body recently designed by The Trailer Co. of America, 31st and Robertson Sts., Cincinnati, Ohio, for O'Brien Milling Co., Greenville, Ohio.

Trailer body for handling bulk grain and packaged flour.

The body is steel, with reinforcing ribs on the outside, thus leaving the inside smooth and free of crevices or obstructions that might interfere with loading and unloading. Sides are 36 in. high with 7 in. flareboards. The rounded front is 48 in. high. The body is 18 ft. long and 7 ft. wide. It is mounted on a Model H-21 Trailmobile, powered by a Reo tractor.

Unit Cooler

DEPENDING on the circulation of cold water as a cooling medium, Modine Mfg. Co., Racine, Wis., recently introduced a new design of unit cooler. In addition to water, the cooler will use alcohol, glycerine, or noncorrosive brine.

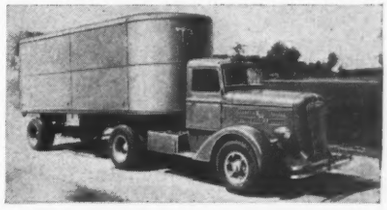
Corrosion Resistant Surface

Tanks, vats, containers and other processing equipment can be protected from corrosion by a new process developed by Tungsten Electrodeposit Corp., Barr Bldg., Washington, D. C. By this process, tungsten is deposited in combination with one or more other metals on the surface to be protected. The combination of metals is chosen to suit the type of corrosion that is to be resisted. Heat and erosion can also be taken care of in this way.

This surface coating is deposited by an adaptation of the standard nickel plating equipment. The coatings needed for protection are thin, but it is possible to polish them, thus promoting ease of cleaning.

Trucks for Heavy Hauling

Wholesale food distributors and others will be interested in a truck recently designed by Four Wheel Drive



Trucks for Heavy Hauling

Auto Co., Clintonville, Wis. It is designed for hauling heavy loads at high speeds. Gross load is 40,000 lb. in the semi-trailer design, distributed 10,000 lb. on front axle, 15,000 lb. on rear axle, and 15,000 lb. on semi-axle. The motor is of 125 hp. Tires are 9.75x20, singles front, dual rear. Speed is 52 m.p.h. on the level.

Packing for Food Equipment

CRANE PACKING Co., 1800 Cuyler Ave., Chicago, Ill., have developed a new packing material for use in industrial plants, called "Super-Seal." It is available in six styles, of which No. 4 is a non-metallic grade suitable for use with edible products. The packing is of the plastic type, flowing under pressure and adapting itself to packing spaces of various types. It comes in the following shapes and sizes: Valve Stem, round 3/16 in., ¼ in., and 5/16 in.; Spiral Form, rectangular, in steps of 1/16 in. from ¼ to 1¼ in.; Coil Form, square, in eleven sizes from ⅜ to 1 in.

Portable Laboratory Mixer

MODEL "L" is the designation of a new style laboratory mixer made by Mixing Equipment Co., Inc., Rochester, N. Y. The mixer is designed to duplicate the actual work of large scale production on a laboratory scale. Power is supplied by a 1/30 hp. motor of totally inclosed, air-jacketed, fan-cooled type. Shafts and propeller are either stainless steel, or Monel metal. Adjustments for various mixing actions are provided. Weight is less than 7 lb. Folding propellers permit insertion in bottle necks, jugs, or bung-holes.

Besides its laboratory uses, the manufacturer of this mixer states that it has many factory applications in mixing small batches.

Just Off The Press

BOOKLETS • LITERATURE • BULLETINS

Food Plant Equipment

1. BAKERY EQUIPMENT—Air-conditioned dough rooms, air-conditioned proof boxes, and bread coolers are treated in three new illustrated bulletins.

2. CONVEYING EQUIPMENT — Conveyors for all food plant bulk and package handling purposes are illustrated and described in a new 112-page general catalog.

3. INDUSTRIAL TRUCKS—Floor trucks for the transportation of food products and other materials are illustrated in a recent 4-page bulletin.

4. MILK EVAPORATORS — Stainless steel, now used for the construction of a well-known line of milk evaporating equipment, gives a better product and better cleanliness with lower costs, according to a recent 16-page bulletin.

5. MIXERS AND ACCESSORIES—"Agitating Equipment" is a 72-page general catalog of mixing equipment, agitators, stirrers, drives and related engineering data, illustrated with halftones, drawings, tables and charts.

6. MIXERS, GRINDERS AND ASSOCIATED EQUIPMENT — "Agitator and Mixer Book" is the title of a 72-page general catalog picturing and describing mixers, agitators, condensers, crystallizers, autoclaves, grinding mills and accessories.

7. PUMPING EQUIPMENT — Centrifugal pumps of the motor-coupled type in capacities from 150 to 5,000 g.p.m., for handling such liquids as fruit juices, beverages, and sugar liquors are the subject of a 16-page illustrated bulletin.

8. PUMPING EQUIPMENT — Rotary liquid pumps for handling viscous liquids, pastes, semi-fluids, corrosive fluids and similar materials are the subject of a recent bulletin, listing applications in the food field.

9. PUMPING EQUIPMENT — Turbine type centrifugal pumps for handling liquids in food and other plants, particularly small quantities at high head, are the subject of a 4-page bulletin.

10. SCREENING EQUIPMENT — Vibrating screens for food materials and other products, with controlled, adjustable vibration to meet the needs of varying screening operations, are discussed in a new 32-page bulletin.

Plant Accessories and Supplies

11. AIR CONDITIONING—Unit conditioners for stores, offices and similar installations are pictured and described in a new 8-page bulletin.

12. EXPLOSION TESTED MOTORS—For use in locations where explosive gases or dusts are encountered, a line of explosion tested motors from 5 to 75 hp. are described by a recent leaflet.

13. ROOFING MATERIALS—Reducing maintenance cost on factory roofs is discussel in "Things You Should Know About Your Roof," a 24-page bulletin

14. SPEED REDUCERS—Specifications for helical gear speed reducers of single and double reduction types are given in an 8-page bulletin.

15. V-BELT DRIVE—Two new data books discuss respectively: multiple groove drives and single groove drives for fractional horsepower. These books give data over a range up to 500 hp.

16. VARIABLE SPEED CONTROL—"Speel Control at Work" is the title of a 32-page bulletin describing how various leading manufacturing companies including some large food producers, use variable speed controls.

Packaging

17. MOISTURE AND PEST PROOF PACKAGING MATERIAL—The use of "Hydrotite" carton board to protect packaged foods from moisture changes or from insect attack is discussed in a new bulletin.

18. PACKAGE LACQUER — Lacquer coating as a means of protecting and intensifying the colors and printing on packages and labels, is demonstrated in a portfolio of samples.

19. PAPER LINERS—Bag and barrel liners of "Corrucrepe" are described in a recent leaflet.

20. TAPE SEALERS—The "Auto-Cut Tape Shooter" for dispensing gummed tape, is described in a new folder.

Trucks, Tractors and Accessories

21. TRUCKS AND TRACTORS—Economy of operation is stressed in a new 16-page bulletin dealing with four wheel drive trucks and tractors for hauling foods and other products.

Control Instruments

22. CONTROL INSTRUMENTS—Pressure and temperature indicating, recording and controlling instruments and their applications form the subject of a new 72-page general catalog.

23. CONTROL INSTRUMENTS—"Valves for Air-Operated Controllers" is the title of a 28-page illustrated bulletin.

24. CONTROL INSTRUMENTS—"Worthwhile Economies in Power Plant Operation" is the subject of a bulletin discussing instruments which indicate, record, signal and control.

Bacteria Control

25. BACTERIA CONTROL—Technical bulletin discussing the use of "Diversol" for the sterilization of equipment and utensils in dairies and other food plants.

Chemical Materials

26. LABORATORY CHEMICALS—Chemical materials for control and research laboratories are listed, with prices, in a recent 144-page catalog issued by a well-known chemical manufacturing concern.

G. L. Montgomery, Managing Editor, Food Industries, 330 W. 42nd St., New York, N. Y.

March, 1937

TO THE READER: Use this convenient form to order the bulletins you need.

Please obtain for me the bulletins indicated by the following numbers:.....

.....

Name.....

Title.....Address.....

Company.....

THEY'RE AFTER YOUR MARKET

▶ A RELATED ITEM DISPLAY, consisting of the ingredients for preparing icebox salads, has been successfully promoted by Larson Co., Greenbay, Wis., makers of "Veg-All." Grouped in this display are gelatin, tomato juice, salad dressing and Veg-All canned diced vegetables. An icebox recipe book accompanies the display. Dealers report increased sales in these related items.

▶ A LEGISLATIVE BILL INTRODUCED in New York aims to restore the State's milk-promotion advertising appropriation to $400,000. Last year's appropriation was $250,000. Previous campaigns are credited with increasing milk consumption 105,492,640 quarts during the last seventeen months, a 6.5 per cent increase for New York, while Boston and Philadelphia, lacking advertising promotion, enjoyed no appreciable increase.

▶ SCHOOL FOR DIVISION MANAGERS, assistants, and merchandising managers is being conducted by Standard Brands, at New York. During the three-day course instruction is given in the company's 1937 advertising and merchandising plans, and the training of route salesmen.

▶ TO INSURE DEALER COOPERATION, Phillips Packing Co., Cambridge, Md., will pay retail dealers ten cents for every case of products purchased, providing the retailer give Phillips' products window and counter display, and also mention the products in handbill and newspaper advertising. Accompanying this point of sale promotion will be a 31-station net work broadcast, a series of colored full pages in national magazines, and a newspaper campaign.

▶ MASSED LENTEN DRIVE IS UNDER WAY to insure heavy seafood buying this year. Gorton-Pew Fisheries is firing weekly shots in 65 newspapers featuring "That Just Caught Flavor." The canned-salmon industry favors magazines with several insertions, including color pages, in nine publications. This campaign is followed up by a salmon-colored folder to dealers which explains the copy angle of the advertisements and offers suggestions for counter displays. The Japanese Crabmeat Association uses radio to launch a campaign featuring Lenten menus.

▶ TWO SUCCESSFUL SALES PROMOTIONS have encouraged still another. Recently, the National Association of Food Chains came to the rescue of the producers and processers of lamb and the producers of grapefruit. A great increase in the consumption of lamb was reported by the chain-store companies participating in the drive. The drive is to continue. Successful, also was the chain store promotion of grapefruit to relieve the 100 per cent over production this year. With these two successes behind them, the chain stores are preparing to launch a campaign to move the surplus canned grapefruit and grapefruit juice, through extensive advertising and point-of-sale merchandising.

▶ THE "100-PER CENT PENNSYLVANIA" type of promotion may be applied to butter, as well as to cheese. Wisconsin butter producers are attempting through the State Department of Agriculture to establish a state brand for Wisconsin butter. They are now working out requirements for the use of such a brand, or seal, which would serve as a guarantee of the quality of the product.

▶ HOW BIG IS A CHEESE that requires a week's supply of milk from Wisconsin cows to make? A guessing contest based on this question and featured in small newspaper advertisements produced a 30 per cent increase in cheese sales in Monrovia, Calif.

▶ KELLOGG IS USING INFERENCE COPY in point-of-sale display to convey the idea that "Kaffee-Hag" induces a "good night's sleep." The display is illustrated by a yawning infant with the caption, "Excuse us if this makes you yawn." This dealer display ties up with a full-page color campaign in 33 newspapers.

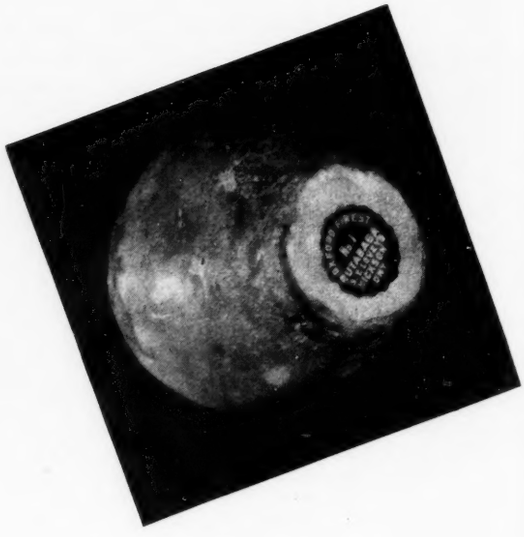
▶ NEW RADIO PROGRAMS are sponsored by C. F. Mueller Co., Hoffman Beverage Co., Breyer Ice Cream Co., Seeman Bros., Whiting Milk Co. and General Mills. Mueller will broadcast over an NBC network from 10:45 to 11 a.m., Monday through Friday, featuring Crosby Gaige; Hoffman over WOR, Monday, Wednesday, Friday, adds these days to its present program, featuring the same program, "Trans-radio News"; Breyer over WOR, broadcasts weather reports three times daily, noon, 4:15 p.m. and 11 p.m.; Seeman over WOR, Mondays and Wednesdays, 3:30 to 4, Fridays 10:30 to 11 a.m., features "Allie Lowe Miles Club;" Whiting over WEEI, Monday, Wednesday and Friday from 1:15 to 1:45 p.m., participating in the Majoris Mills Home Economic program; General Mills, over Columbia network, Mondays through Fridays, 10 to 11 p.m., featuring Sarah Pennoyer, of Bonwit-Teller.

Globe Photo

WHERE IS YOUR PRODUCT?

Which of the displays in this store makes the strongest bid for the customer's dollar? Will the housewife choose fresh or canned foods? Impulse buying accounts for a large portion of retail sales, especially the PLUS sales, and varies with the amount and kind of display. Here is an object lesson in retail store display.

New PACKAGES



Coffee Ground to Suit

EVEN in this modern age a good cup of coffee is something of a culinary accomplishment. So to make it easier to prepare the national beverage properly Wm. Boardman & Sons, Hartford, Conn., sees to it that consumers get the grind best suited to their kitchen equipment. It packages its Putnam brand in three grinds—percolator, drip and Silex —instead of in one general-purpose grind.

Canned Apple

SLICED APPLES which may be eaten alone or used in pies, cakes, dumplings and other desserts, have been put on the market. The innovation of Cherry Growers' Packing Co., Traverse City, Mich., the product is packed in a well-seasoned syrup. "Reddi-Maid Apple Slices" and "Montmorency" are the brand names.

Container with a Reason

DUFF'S MOLASSES, product of P. Duff & Sons, Pittsburgh, was for over 40 years offered for sale in the original tin can with paper label reminiscent of the Gay Nineties. The introduction into the company of an aggressive policy early in the depression resulted in an investigation of consumers' likes and dislikes. The housewife expressed herself freely, but none too pleasantly. She liked molasses, but she did not like paper labels, nor did she like to punch holes in the can from which to pour the molasses. She complained most that the molasses ran down the sides of the can and made her shelves sticky, as well as the paper label. To meet her demands, Duff's patterned the new container after the beer can with the crown cap, adding a lithographed label in place of the old paper label. Molasses when poured from this type of container rarely ran down the can sides. If ever it did, the molasses was easily removed with a damp cloth or by holding the can under the kitchen faucet. This container, better accepted than the discarded can, justified its introduction. But Duff's, had not yet satisfied the housewife. Like many other containers, the molasses can is seldom emptied when first opened and must therefore be resealed for future use. Duff's have now replaced the crown cap with a screw cap.

Trade-Branded Vegetables

S. T. LOVEY Co., Hickson, Ontario, has solved the problem of trade branding at least one of its vegetable products, the rutabaga, which the company identifies, according to grades, with a label. Identification by a trade name was made possible by cutting off the root tip and pasting a paper label on the flat surface remaining. After labeling, the entire rutabaga is dipped in paraffine. This protective coating, which acts as a preservative, is easily removed when the vegetable is peeled. This combination of labeling and preserving has two advantages. The label has educated customers to purchase by brand; the paraffine permits shipment to greater distances, because the wax coating keeps the vegetable fresh without the necessity of refrigeration. Shipments are being made to metropolitan centers throughout the United States.

First Cheese Wrap Changed

MANY PRODUCTS whose packages have weathered the years since their introduction are now stepping out in new containers. "Shefford Snappy Cheese," a product of Shefford Cheese Co., New York, said to be the first cheese packaged in this country, has until recently been marketed without variation of container or design. The interesting part of the present package is the fact that the change has been an evolution through a succession of slight package changes. This gradual change has preserved the familiarity customers had with the original package and design. While the general characteristics of the original label have been retained, all embellishments and examples of early filigree art have been dropped in favor of the simplicity of modern design.

From Limited to Mass Sales

HOVDEN FOOD PRODUCTS Co., Monterey, Calif., have for fifteen years packed hand dressed "Fancy Filets of Sardines," 3½ and 7½ oz., which sold at fancy prices in "Ritzy" and exclusive grocery stores. Hovden's now machine filet

AND PRODUCTS

the fish and machine wrap in transparent cellulose their present can, which has gained a national distribution at 10 cents per can, with plant capacity unable to meet the demand. The present 9-oz. can requires a can opener, but is, nevertheless, preferred at the 10 cent price by mass consumers, who will sacrifice at least some utility for price consideration. The present cellophane wrapped package carries a label that bears a striking likeness to the partly opened can. Massed displays generate a strong urge to buy.

Gems in Sugar

"KOFFYTEE," a crystalline sugar resembling rhombic gems, is the new product of American Sugar Refining Co., New York. The sugar gems, about the size of two-carat diamonds, are displayed in a double-walled, transparent cellulose bag having a rolled top that is securely sealed with a tin insert fastener. The cellulose bag, topped and footed with bright yellow, is displayed on a special cardboard rack designed to feature a single unit. Koffytee is suggested as a hostess sugar, a smart and fashionable novelty for teas and luncheons. American Sugar Refining Co. is introducing this product through outlets in Manhattan and Westchester counties, New York, and Fairfield County, Conn., as a test to determine the reaction of consumers. In one of these areas, this crystalline sugar is selling at 15 cents per pound.

Twin Cereal

DISTINCTIVE FLAVOR, high nourishment and economy to the consumer are credited to "Wheat Oata," the latest addition to the product family of Ralston Purina Co., St. Louis. As the name suggests, the cereal is a wheat and oat porridge. The cooking time is 3 minutes; the cost, less than one cent a serving. It is packaged in a tight-wrapped cardboard carton, the checkerboard design of which gives it eye arresting value and ties it in with other packages of the Ralston family.

News in Bottles

FROM ENGLAND comes news of a novel container for retailing beer—a bottle made of paper and closed with a crown cap. It is claimed that this container is lower priced than either bottle or can. Laboratory tests are said to have produced satisfactory results. A test pressure of 60 lb. per sq.in. was applied without harmful effects to the bottle. The paper is prepared in such a manner that it is capable of withstanding pasteurization (one hour at 145 deg. F.) and maintaining its shape during the subsequent cooling process. It remains to be seen whether this newcomer is merely a novelty or will gain practical importance.

BUSINESS TRENDS

Commodity Prices Lower

DURING MOST OF FEBRUARY the trend in commodity prices was generally lower, as was predicted in these columns last month. Indication of the extent of this readjustment is given by the change in the New York *Journal of Commerce* Daily Index of commodity prices, in the four weeks Jan. 13 to Feb. 10, from 164 to 162.6. Around Feb. 1 this index stood below 160, but despite some rise since then, its general tendency was slightly downward.

It should be noted, however, that in spite of the fact that the Feb. 1, 1937, level of commodity prices was about the lowest for the year so far, it was the highest Feb. 1 figure recorded during the past twelve years. The Dun and Bradstreet's index on that date was $203.206 and on Jan. 1, 1937, it was $206.544. These were the first two months since March 1, 1925, to reach above the $200 mark.

Cocoa Falls, Then Rallies

FIGURES on the Gold Coast cocoa bean crop, the last to be harvested during the current crop year, are now available. The total is given as 235,000 tons, well in line with previous estimates. While some of this still remains to be marketed, most has already been harvested and the estimate is considered accurate.

That the price of cocoa beans, reaching to over 13 cents per lb. in January, was unwarranted by the supply and demand situation became evident by the sharp reaction late in that month and early in February. Like most reactions, this movement apparently went too far, with the price dropping to around 9 cents when certain manufacturers began to unload stocks. Later in the month the price started upward again, being near 10 cents at mid-month.

In considering these violent fluctuations in the cocoa bean market, it is well to keep in mind the two facts that existing cocoa bean supply is below normal and that world consumption of cocoa products has advanced sharply during the past year.

Construction News

	Pending (thousands)	Awarded February (thousands)	Total Awarded 1937 (thousands)
Bakery	$120	....	$224
Beverages	1,662	....	762
Canning and Preserving	325	....	....
Confectionery	....	....	....
Grain Mill Products	725	$370	357
Ice Manufactured	120	....	40
Meats and Meat Products	220	100	270
Milk Products	435	200	677
Miscellaneous	460	553	1,060
	$4,067	$1,223	$3,590

Oils and Fats Ease

SOMEWHAT THE SAME SITUATION as exists in the cocoa bean market has come to light in vegetable oil trading. Increased lard stocks in Chicago, up some 19,000,000 lb. in the month of January, removed some support from cottonseed oil. Cocoanut oil has also lowered in price and, with it, most of the edible and soap oils have come down. Increased imports of edible oil have also been a factor in this market.

Huge Egg Surplus

FOOLED by an abnormally warm winter, hens have been working overtime. Consequently, there is a large surplus of eggs in stock.

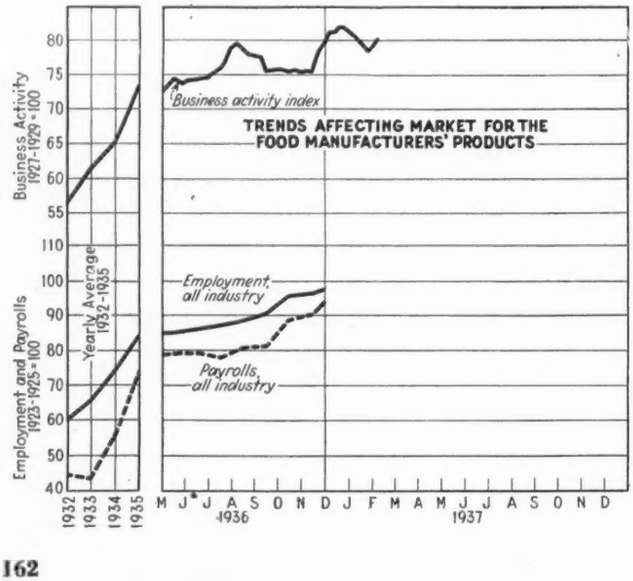
Partial relief of this situation will come from the government which, by the end of February, will have spent about $1,000,000 for eggs, to be distributed in the flooded areas of the Ohio and Mississippi valleys.

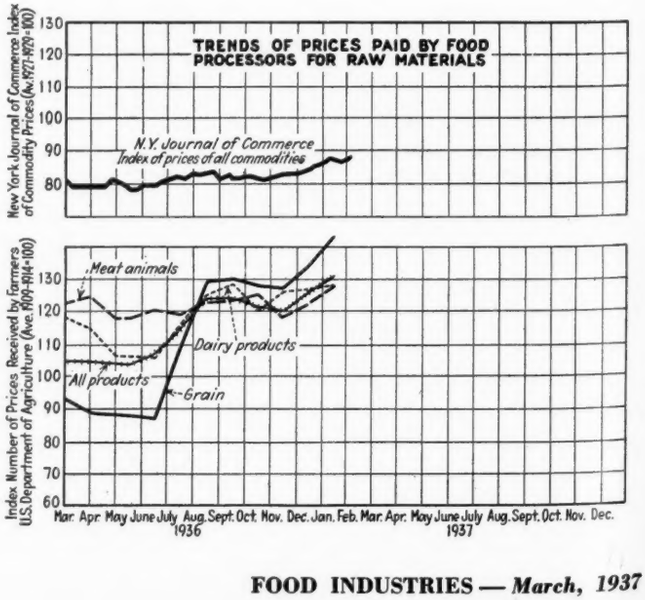
However, the egg surplus situation is still worrying all factors in the poultry industry. This is true in spite of the fact that Secretary Wallace plans to continue government purchases as conditions warrant.

The purpose of the government purchases has been dual, and has not been primarily for relief. The primary objective was to check the continuation of the abnormally sharp decline in farm egg prices. They were aimed at discouraging the widening of the spread between farm and retail prices, and also to discourage the heavy forced sales of poultry this winter and the threatened reduction in spring hatchings. Both of these factors would lead to excessively high prices for eggs later on.

In speaking of the situation, Secretary Wallace said "it shows very clearly how the long time interests of farmers and consumers coincide. By stopping the sharp decline, the government encourages poultrymen to keep their flocks nearer to normal figures, and there could be no better use for the eggs taken from the market than shipment to flood stricken areas."

The Secretary explained the reasons for the abnormally large supply by saying that, while the warm weather




New York Journal of Commerce Index of Commodity Prices (Av. 1927-1929=100)
TRENDS OF PRICES PAID BY FOOD PROCESSORS FOR RAW MATERIALS
N.Y. Journal of Commerce Index of prices of all commodities
Index Number of Prices Received by Farmers U.S. Department of Agriculture (Ave. 1909-1914=100)
Meat animals
Dairy products
All products
Grain
Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec. Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
1936
1937

Business Renews Upward Trend

POLITICAL AND LABOR JOCKEYING, flood devastation, and Western freezes have been unable to keep general business activity in a depressed state during the past month.

After dropping to a low of 78.9 per cent of "normal" during the middle of January, *Business Week's* index of business activity rebounded to 80.4 per cent for the week ending Feb. 6. At the level of 79.1 the index is still 0.25 per cent higher for the month ending Feb. 20.

Settling of the shipping, motor and glass industry strikes has been a helpful factor. Subsidence of the Ohio River Valley floods had an encouraging effect. Steel production, residential construction, retail sales and carloadings actually increased during the month.

Commodity prices have shown a mixed movement during the month. For the four weeks ending Feb. 13, U.S. Department of Labor reports a decline of 0.12 per cent in the wholesale price of all commodities. Farm products are 0.76 per cent lower while foods fell off 0.80 per cent. Weighted price indexes of the New York *Journal of Commerce* indicate a definite upward movement in prices. For the month ending Feb. 20 the general index moved upward 2.66 per cent. The index of grain prices shot up 4.13 per cent and that for foods climbed 1.94 per cent.

increased the supply, consumption declined largely because of the spread between wholesale and retail prices, which was larger than usual. In addition, cancellations of orders for baby chicks added to the egg supplies.

"Everyone loses in the long run by excessive price fluctuations," said the Secretary. "They result in a waste of soil, effort, income, and the commodities themselves."

Canned Food Stocks Lower

QUARTERLY CANNED FOOD STOCKS STATISTICS, available too late in January for mention in the last number of FOOD INDUSTRIES, indicate that packers entered 1937 with considerably less on hand than was the case in January, 1936. Canned corn stocks were 34 per cent lower, peas 29 per cent lower, green and wax beans 54 per cent lower, and peaches 23 per cent off. Pears were the one exception reported, with stocks in canners' hands 32 per cent greater than a year ago.

More Gelatine Made

EDIBLE GELATINE PRODUCTION has shown a steady increase since 1933, when the total output was 13,045,441 lb. Since then output has been: 1934, 15,320,350 lb.; 1935, 18,274,495 lb.; and 1936, 20,321,863 lb. The output in 1929 was 18,624,400 lb. so that past two years showed record production.

Damage By Frost

FRUIT AND VEGETABLE OUTPUT in California and Arizona will be considerably lower this year because of the freezes that occurred in these states in December, January and February.

Citrus fruits were most severely damaged. The Bureau of Agricultural Economics of the U.S. Department of Agriculture reports that the California grapefruit and lemon output has been cut 30 per cent below the Jan. 1 estimates, with Valencia oranges 32 per cent off, and navel and miscellaneous oranges down 26 per cent. Arizona grapefruit suffered heavily, but no estimate of the damage has as yet been made.

Lettuce, celery and peas were the vegetable products to suffer most in the Coast freezes.

As far as the supply of oranges and grapefruit goes, there should be no serious shortage. Florida has large crops of both fruits, and except for the fact that unusually warm weather is causing these crops to ripen somewhat earlier than usual, there seems to be no threat as to the supply. In addition, the lower Rio Grande Valley of Texas will produce considerably more grapefruit this winter than in previous years. Also, Texas and Florida crops of winter vegetables promise to be large. Florida snap bean production is estimated to be 42 per cent over the 1936 yield, Florida tomatoes are said to be 32 per cent more plentiful.

Wheat Movement Reversed

AFTER BEING THE FIRST of the speculative food commodities to experience a setback, when the price fell off during January, wheat again reversed its trend in early February. Argentine shipments in late January probably accounted for the speculative drop at that time. However, the essential factor of restricted supplies continued to act. And when both Spain and Germany entered the market actively in February, the price recovered, increasing as much as 9 cents a bushel in one week.

INDICATORS

BUTTER IN STORAGE in the United States on Feb. 1, 1937, totaled 42,484,000 lb., compared to 21,502,000 lb. on the same date of 1936, and a five-year average for the date of 31,349,000 lb.

MEATS, ALL KINDS, in cold storage on Feb. 1 amounted to 1,062,316,000 lb., up about 40 per cent from the 622,347,000 lb. reported on Feb. 1, 1936, and comparing to a five-year average of 744,091,000 lb.

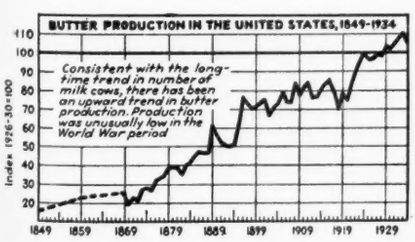
PEANUT PRODUCTION in 1936 totaled 1,311,560,000 lb., the biggest crop on record, with Georgia, Alabama and Florida alone accounting for 736,000,000 lb.

EVAPORATED MILK PRODUCTION in 1936 increased more than 11 per cent over the 1935 output, while the condensed milk production was also greater.

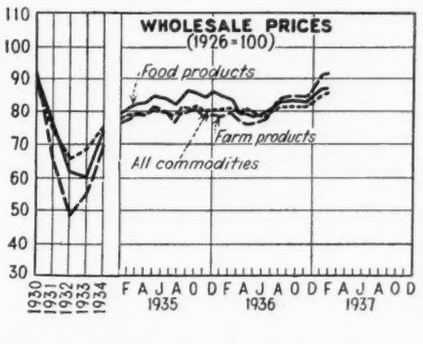
CANNED GRAPEFRUIT JUICE to the amount of 1,500,000 to 2,000,000 cases will be purchased this year by the Federal Surplus Commodities Corporation for relief distribution.

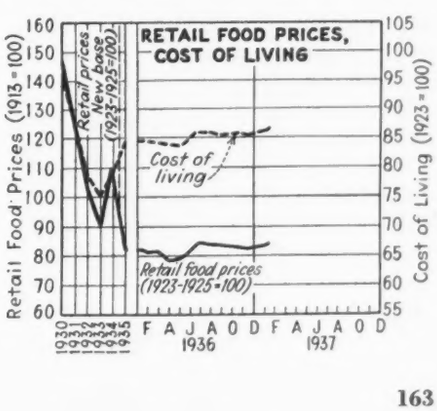
OLEOMARGARINE SALES in the U.S. in 1936 were 390,901,942 lb. an increase of 2.7 per cent above 1935 sales.

DUN & BRADSTREET'S WEEKLY FOOD INDEX has been trending downward lately, having dropped about 2 per cent from its record high of $2.99 on Jan. 12, 1937, but nevertheless it is about 10 per cent above the level recorded at this time last year.


BUTTER PRODUCTION IN THE UNITED STATES, 1849-1934
Consistent with the long-time trend in number of milk cows, there has been an upward trend in butter production. Production was unusually low in the World War period
Index 1926-30=100
1849 1859 1869 1879 1889 1899 1909 1919 1929

Prices received by farmers are from the U. S. Department of Agriculture. Employment, payrolls, wholesale prices and retail prices from the U. S. Department of Labor. The business activity index is that of *The Business Week*. The cost of living index is from the National Industrial Conference Board. The curve above, based on figures from the U. S. Department of Agriculture, shows growth in butter productions over an 85 year period.


WHOLESALE PRICES
(1926=100)
Food products
Farm products
All commodities
1930 1931 1932 1933 1934
F A J A O D F A J A O D F A J A O D
1935 1936 1937


RETAIL FOOD PRICES, COST OF LIVING
Retail prices New base (1923-1925=100)
Cost of living
Retail food prices (1923-1925=100)
Retail Food Prices (1913=100)
Cost of Living (1923=100)
1930 1931 1932 1933 1934 1935
F A J A O D F A J A O D
1936 1937

Keeping Up WITH THE FIELD

Effects of the Flood—What Congress is Doing—Industry Activities —Federal Regulations—Washington Views

Food Bill May Pass. With President Roosevelt making very clear his wish for food and drug legislation this session, and with Senate and House leaders anxious to oblige, prospects for effective action on the bills now pending appear better than good—almost excellent.

There are still some hurdles for the proposed legislation to jump, though one of the most difficult vanished with the retirement of Rexford Tugwell to a position in industry. Opposition to Tugwell, his methods and objectives, proved one of the rocks on which the measure smashed last year. Now that he has gone, the feeling of irritation against the Department of Agriculture, and Dr. Campbell's Food & Drug Administration, appears to be subsiding rapidly.

This must not be taken to indicate that FTC friends in Congress have given up the fight. Led by Rep. Clarence F. Lea, chairman of the House Committee on Interstate and Foreign Commerce, they are going to bat on that point "if it takes until summer." But they are planning to make the fight as innocuous and quiet as possible. They want to avoid all irritation of any sort, both within and without Congress. Comments like those of Dr. Francis L White, National-American Wholesale Grocers' Association, that the Chapman bill, would, if passed, react against the interest of the small manufacturer, get under their skin. Unfair and inaccurate is their reply to the assertions that the bill contains provisions which would complicate labeling of food products and increase the cost of those products.

Referring to the repeated report that Congressman Lea is planning to introduce a third food and drug bill to take the place of the pair now pending, it can be definitely stated that such a step will be taken only as a last resort.

FTC Reports Unfairness. Considerable information indicating the existence of unfair practices in the distributon of fresh fruits and vegetables has been obtained by the Federal Trade Commission in its investigation of the distribution of these products.

In the terminal inspection of fresh fruits and vegetables, and in the filing of loss and damage claims against the carriers, many abuses have developed in recent years, the FTC claims. Since the various inspections form the basis for claims, any misstatements as to the extent of the damage tends to promote unfair settlements. The various private inspection services used by receivers and shippers have often been charged with bias in favor of the parties employing them, whereas the inspection agencies of the carriers have likewise been accused of being biased in favor of the railroads.

Beyond the question of bias, multiplicity of inspection services has resulted in duplication and unnecessary expense, the Commission reports. On most cars of the more perishable commodities arriving at the principal markets, there are now two separate inspections, and in many cases three. It is alleged that some receivers have several inspections made solely for the purpose of selecting for claim purposes the certificate showing the greatest damage.

The FTC will make its final report on this investigation by May 31.

What the Flood Did. Food manufacturers and distributors were hard hit by the latest and greatest of the Ohio River floods. Many plants and warehouses were inundated. Many more were rendered inoperative when power failed on "Black Sunday", Jan. 24. And still a greater number could not distribute in the submerged areas except by boat. The food supply problem became acute because of the long duration of the flood. And food plants resorted to all possible emergency measures to maintain production.

In Louisville, only a few plants were seriously damaged. Ballard & Ballard's mill was deep in the overflow of boiling Beargrass Creek, but most of the others "shipped" only a little water. The primary problem at Louisville was to maintain a supply of power to the plants, because it was almost impossible to bring any sizable supply of food into the city from other towns.

Power for Grocers' Baking Co., Donaldson Baking Co. and Fenley's Model Dairy, Inc., was obtained through an emergency "hook-up" with the Henry Vogt Machine Co.'s power plant. The large Plainview Dairy, which for a time supplied most of the milk for the downtown area, obtained power from the same emergency source that supplied WHAS. Ewing Von Allman Dairy, Louisville's largest milk plant, used a gasoline-engine generator set obtained for them by the Department of Agriculture. Armour & Co.'s large creamery in South Louisville had a supply of bulk butter on an upper floor, but had no power to cut it for distribution, so the Department of Agriculture supplied a 30-kw. generator set. This same generating unit went to Henry Fischer Packing Co. after Armour's power connections were reestablished on Feb. 9. Swift's plant was without power until Feb. 10, and the Ballard & Ballard mill was shut down for an even longer time.

The dreaded post-flood disaster—explosion and fire—destroyed the building of Hancock-Ballinger Coffee Co. in Louisville. The explosion, which occurred as the waters began to recede, was so severe that it broke windows within a radius of several blocks.

Among other important food plants inoperative in Louisville were the Grocers' Biscuit Co., Hampton Cracker Co., Coca-Cola Bottling Co., General Baking Co., Purity Bakeries and Ward Baking Co.

Aside from plant damage, Louisville food companies suffered destruction of submerged packaged goods. All food reached by the flood waters was ordered destroyed, including the contents of screw-top containers and corked bottles, together with that in cartons. Canned foods which became wet must be relabeled, and hermetically sealed containers were ordered sterilized before being opened.

At Jeffersonville, Ind., across the river from Louisville, the Stokely canning plant was flooded.

In Evansville, the Igleheart mill had four or five inches of water on the first floor. While Igleheart suffered little damage to equipment or to flour, trouble was expected from wheat which became wet in the bottom of the elevator tanks. The mill was down for several days, during which time employees were kept on the payroll.

Cincinnati food factories were not flooded as badly as those in the towns farther down the river, but many bakeries were closed. A & P brought in bread from its plant in Toledo; Schulze Baking Co. from plants in Chicago, Peoria and Grand Rapids. Banner Baking Co. and National Bread also imported bread. Colter Co., Kroger subsidiary, had to carry its goods to the roof and over the tops of adjacent buildings to sections where trucks could carry it to a temporary warehouse. Burke Grocery reports a substantial loss, the extent of which has not yet been determined. The meat packing plants of Kroger and of E. Kahn's Sons were damaged, as was the factory of American Can Co.

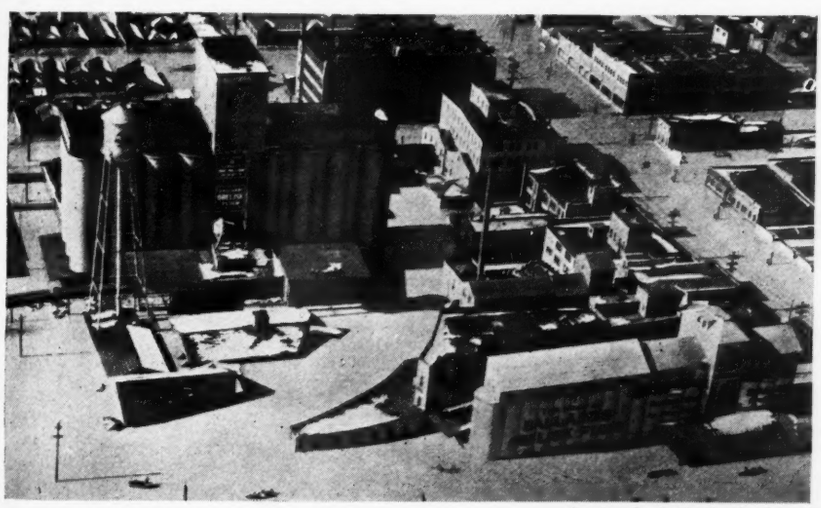
Roth Baking Co., Covington, Ky., was badly damaged by water which reached the second floor.

Heekin Can Co., in Cincinnati, had an emergency order from the Red Cross to pack beans, but the plant was without its main supply of power. However, a resourceful chief engineer solved the problem. He went to Allis-Chalmers across the street and borrowed a 40-hp. synchronous motor and a 40-hp. d.c. motor, connecting these together as a motor-generator set. He had some small d.c. capacity, so he could drive the makeshift set and get enough alternating current to operate a canning line. The boiler-feed water supply also failed, and with it the generation of process steam. But the chief engineer kept the plant operating by pumping seepage water from the basement into the boilers until the receding flood waters drained the cellar.

The plants mentioned are not the only ones to suffer, but these outstanding examples show what happens to the food industry when the Ohio goes on a rampage. Nor was the effect of the flood limited to the immediate flood area, because plants from all over the Midwest were called upon to supply food to the stricken cities. Bottled milk was shipped in from Chicago, fresh water was carried to Louisville from Chicago in a Bowman Dairy tank truck, and bakeries in several towns sent bread. Standard Brands, which takes pride in its distribution system, managed by one means or another to supply bakeries with yeast and consumers with coffee.

Globe

The plant of Hook-Aston Milling Co., Zanesville, Ohio, was caught in the flood waters.



Courtesy Louisville Courier-Journal

Ballard & Ballard Co.'s mill at Louisville standing deep in a sea of muddy water from the Ohio River.

Wide World

Several factories at Cincinnati were inundated. At the end of the suspension bridge, on the right, is the building of Heekin Co.

Lead Tolerance. Announcement has been made by the Food & Drug Administration that the lead tolerance for spray residues will remain at 0.018 grain per pound for 1937 and until further notice. Tolerances for arsenic (expressed as arsenic trioxide) and for fluorine are given in each instance as 0.01 grain per pound.

Attacks R.P. Law. In defense against the charges of the Federal Trade Commission that it violated the Robinson-Patman law, A&P challenges the constitutionality of the law. Subsection (c) of Section 2 is void, A&P claims, because it deprives persons of the right to contract, irrespective of the effect of such contract on commerce among the several states. Further grounds for calling the law unconstitutional is that it deprives persons of the right to freely contract with respect to rendition of personal services, and in that it seeks to make unlawful an agreement between persons with respect to payment for

services without regard to the effect on interstate commerce of such services.

As a second special defense, A&P calls the law unconstitutional because it authorizes FTC "to prevent the doing of that which is not by the act, in and of itself, declared to be unlawful."

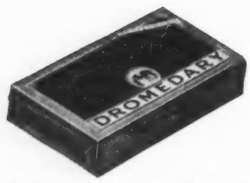
Thrown in for good measure is the allegation that the law violates the Fourteenth Amendment because it impairs the private right of freedom of contract and withholds from a person owning and operating retail stores the right to purchase commodities for sale on the best available terms.

Package Show a Hit. No less than 10,000 executives are expected to attend the conferences on packaging, packing and shipping to be held in New York March 23-26, concurrently with the Packaging Exposition. These men will take advantage of a conference program exceeding in scope, diversity and number of topics any previous conferences of this character. The preliminary program has been announced by American Management Association, sponsor of the conferences, and it includes addresses on package design, the Robinson-Patman Act, packaging material, packaging as a management problem, bulk packaging, packaging machinery and packing and shipping.

Bill Favors U. S. Sugar. American sugar producers have yielded in their demand for removal of all restrictions on continental production. But they hope to obtain through the Overton Bill a quota amounting to one-third of domestic consumption. This measure allots 20.36 per cent of the remaining requirements to Hawaii; 17.33 per cent to Puerto Rico; 0.12 per cent to the Virgin Islands; 21.58 per cent to the Philippines; 40.06 per cent to Cuba, and 0.55 per cent to other foreign countries. In event the United States can not fulfill its quota, the deficit would be prorated among the other producing territories.

To further encourage domestic production, benefit payments of 60 cents per 100 lb. are proposed. If this passes, an excise tax of ½ cents a pound will not be opposed by Congressmen from the sugar states.

Package Improvement with an EYE on Costs



This package appetizingly displays the dates; also protects goods against weevils or other contamination.

Printed transparent cellulose wrapper located accurately on the goods by one of our Electric-Eye wrapping machines.

Three different sizes of Milkweed Cream are attractively wrapped in cellulose by one of our adjustable machines.

We perfected easy-opening devices for chewing gum manufacturers. Also applicable to other products.

In recent years package improvement has become about as important as product improvement . . . For manufacturers appreciate, more than ever before, the heavy task the package must bear in *making the sale.*

But to improve a package, and at the same time keep costs at a minimum, requires experience—even a fraction of a cent saved per package is important. We have assisted many concerns to solve their packaging problems—problems involving a great variety of products and types of packages. Our sound, factual knowledge can benefit you.

For example, we can give you definite and authoritative information as to the type of package best suited to machine production; the kind of material to use; the form in which this material may be purchased at lowest cost; the mechanical equipment and plant layout for utmost efficiency.

In fact, when the problem is thoroughly studied well in advance, we sometimes find the improved package actually costs less than the former one.

SUGGESTIONS

We may be able to suggest an improvement in your package which has not occurred to you—or a way to save you money. Send us your package with a brief description of your present methods. We will be glad to give you our suggestions without obligation. Get in touch with our nearest office.

PACKAGE MACHINERY COMPANY
SPRINGFIELD, MASSACHUSETTS
New York Chicago Cleveland Los Angeles
Mexico: D. F. Apartado 2303
Peterborough, England: Baker Perkins, Ltd.
Melbourne, Australia: Baker Perkins, Pty., Ltd.

PACKAGE MACHINERY COMPANY
Over a Quarter Billion Packages per day are wrapped on our Machines

CONCENTRATES

• *Battle lines over the Administration's pet policy of extending the reciprocal trade Agreements are taking concrete form. President Roosevelt is prepared to "turn on the heat", while beef, dairy and general farm interests are organizing the attack.*

• American food products, including canned fruits and vegetables, pork, lard, beef, prepared milk products, cereals, bakery products, canned salmon, sardines and shell fish, are pictured as benefiting by the reciprocal trade agreements in a report by the House Ways and Means Committee.

• *Among new bills introduced in Congress is one (S.1258) which would permit Surplus Commodity Corp. to purchase fishery products. A second bill (H.R.4478) proposes an increase in the tariff on cashew nuts from two to fourteen cents a pound. A House Joint Resolution would authorize the United States to participate in the International Dairy Congress to be held in Berlin.*

• Hawaiian pineapple has taken the lead from peaches as the largest seller in canned fruits in the United States. This is said to be the result of a better promotional job on the part of the pineapple canners.

• *Glucose is a safe and wholesome food in any form, says the FTC, which has ordered Loft, Inc., to cease disparaging the candy of competitors on the ground that their products contain glucose.*

• Rapid growth of the pilchard reduction industry in Washington is worrying salmon canners of the Pacific Northwest, because pilchard is food for the salmon.

• *Large-scale development of the pea-canning industry is taking place in the region of Walla Walla, Wash. One-tenth of the total pack for the country was turned out there last year, it is estimated.*

Mid-February

CAPITAL VIEWS

SUPREME COURT controversy overshadows all other Washington activities. The fundamental issue lies between those who would revise and those who would evade the Constitution. Early "victories" will not be decisive.

The most serious aspect of the differences which develop in this controversy appears to be the fact that the Administration reformers have succeeded in making the issue appear to be Progressives vs. Reactionaries. Until that false appearance of alignment is fully dissipated, no real settlement can be expected to be long effective.

» FOOD FOR UNCLE SAM—Sales of food to the Government under the provisions of the Walsh-Healy Law have not yet encountered those complications with which metal purveyors are struggling. But these difficulties certainly lie ahead. As perishables, there will be many foods which cannot be sold to Uncle Sam without compliance with the wage-and-hour features of Blue Eagle days. But processed foods cannot escape on this ground, it now appears. Shortly, those who sell canned goods, coffee, sugar and a multitude of other processed products to the Army, Navy or institutional divisions of the Government, will have serious policy questions to settle.

CONVENTIONS

MARCH

4– 6—Canners' League of California, Hotel Del Monte, Del Monte, Calif.
8–11—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago.
8–13—State College of Washington Institute of Dairying, Pullman, Wash.
12–13—National Association of Bakers' and Confectioners' Supply Houses, spring meeting, Edgewater Beach Hotel, Chicago.
15–20—Ice Cream Manufacturers' Short Course, University of Minnestoa, St. Paul.
23–26—Packaging Exposition and Conferences, sponsored by American Management Association, Hotel Pennsylvania, New York.

APRIL

———Dairy Products Association of the Northwest, St. Paul.

» POST-FLOOD FIRES—The Department of Agriculture warns farmers that wet hay and other soaked products are likely to result in spontaneous combustion. Food processors in flood areas will, the Department chemical engineers hope, take equal precautions. Material which has been soaked is likely to heat badly and may take fire spontaneously with results even more disastrous than was the devastating water.

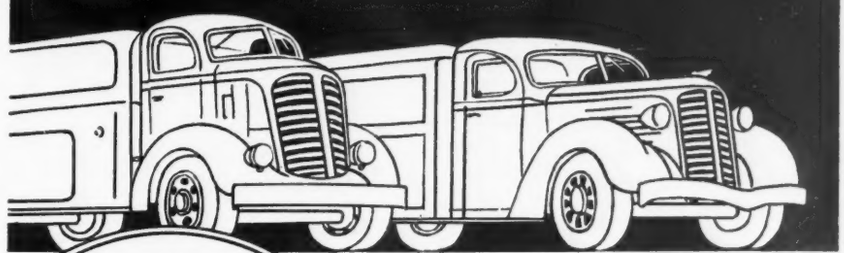
» MORE TARIFF CUTS—The President and the Department of State will continue for the coming three years to negotiate new trade agreements, if Congress passes the expected legislation continuing this tariff-fixing authority. The major change will be increased publicity for the proceedings. Already, Secretary Cordell Hull has promised to announce that negotiations are contemplated as soon as even tentative negotiations are undertaken. As discussions progress, he promises to announce what commodities are under discussion.

This new type of publicity will, it is

Sterilize and De-odorize

FOOD TRUCKS

this effective, low-cost Oakite way!



ASK US

about any maintenance job, whether cleaning or sterilizing truck interiors, washing exteriors, stripping paint, cleaning repair parts, washing garage floors. Maintenance superintendents and others operating food trucks in the following industries are invited to take advantage of our nation-wide service in helping them save money:

MEAT
SEA FOOD
BREAD . . . CAKE
PIE
DAIRY PRODUCTS
ICE CREAM
AND OTHER
FOOD PRODUCTS

Clean, sanitary trucks prevent contamination of your products

Today, more concerns realize that the best, low-cost assurance of DELIVERING the same, high quality product they ship . . . is to keep food trucks clean and sanitary and free from odors.

Maintenance superintendents have found an easy, effective way to do this and prevent the formation of mold, bacteria and other harmful growths that are the source of contamination and off-flavors in products. Here's how . . . they throughly wash truck floors, walls, racks, etc., and followed up by wiping or spraying with OAKITE BACTERICIDE.

Let us tell you more about this inexpensive Oakite cleaning and sterilizing method. Won't you write today?

Manufactured only by
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SPECIALIZED INDUSTRIAL CLEANING MATERIALS & METHODS

expected, give all interested parties their opportunity of commenting soon enough to be effective, and prevent many industries from making merely blanket appearances on the suspicion that their goods are being debated as a subject of tariff change. Regardless of the publicity now promised, no change is expected in the plans for continued heavy cutting of American import duties.

» RESALE PRICES—Congress will probably enact this spring comprehensive legislation limiting the cutting of prices by retailers of advertised trade-marked goods. A Federal law on this subject cannot be absolute but will be largely dependent on the existence and effective enforcement of State laws. The Federal part will be first to forbid movement of goods in interstate commerce into territory for such sale as is forbidden by the States. Second, and much easier of enactment, the Federal Government will suspend the Federal antitrust laws with respect to such resale contracts as might now be prosecuted on the ground of restraint of trade.

PAK-ICE

Protect Your Product and Your Profit . . . .

The Vilter Pakice machine makes ice in the form best adapted for product icing. Either briquette or crystal form available quickly for bunker icing, top icing or other forms of product cooling.

Saves cost, saves labor, saves time; lasts longer, protects the product better.

Pakice is automatic, easy to handle and requires little attention. Takes little space and requires small investment which will return substantial savings.

Capacity thirty tons a day. Makes as much or as little as you want, when and as you want it.

Investigate the many advantages of this remarkable ice plant for your particular needs

Write

THE VILTER MANUFACTURING COMPANY
"SINCE 1867"
2115 SOUTH FIRST STREET MILWAUKEE, WIS.
Representatives in Principal Cities

» INFLATION—Industrial goods prices have been advancing sharply. Curves showing recent averages have been virtually standing on end. This means a variety of inflation more dreaded by the economists than most other kinds. Socially it is bad, because it means high cost of living for the householder and industrialist alike.

» FOOD DEMONSTRATORS—In one complaint under the Robinson-Patman law, the Federal Trade Commission charges discrimination in favor of certain retailers because demonstrators have not been furnished to all merchants on equal terms. It happens that this manufacturer deals in cosmetics and his demonstrators were "beauty counsellors." But the principle is the same. Washington has not yet noted a case in which discrimination is charged for furnishing more comely demonstrators to one merchant than to another.

» GREAT-PLAINS ECONOMY—The President asked Congress in mid-February to establish a new governmental agency to formulate a long-time program for the Great Plains area. Citing drought, agricultural depression, and a score of other economic threats to Midwestern agriculture, the President transmitted his Great Plains Drought Committee report. The cooperative Federal-State enterprise is recommended. But no specific form of legislation was published with the original message.

This whole matter relates fundamentally to raw-material supply for the food industries. Insofar as it can stabilize agricultural production it would probably be constructive, more for the food manufacturers than for any other division of industry. It differs essentially from all other Department of Agriculture efforts.

» LOSS LEADERS—Specific legislation to forbid the use of loss leaders in merchandising is contemplated in Washington. The form of this legislation that may be chosen, in order to gain a semblance of constitutionality, remains vague. The effort will be valiant, perhaps even partially effective.

» BUDGET BALANCE—The great Ohio River floods will stimulate greatly expanded flow of money from the Treasury under the guise of relief. Conservatives are horrified by the fact that the five-year program to expend six billion dollars on a coordinated plan of waterway development hardly made the front pages of newspapers. The horror comes not from the size of the spending contemplated, which is not much greater than past pork-barrel legislation. The cause of mental anguish is that the spending of billions is now so casually considered as to make budget balancing a fiction.

MEN, JOBS *and* COMPANIES

Industry

» ARMOUR & Co. will soon begin construction of a new million-dollar pork house at South Omaha, Neb. The plant will have a capacity of 8,000 hogs daily. Armour recently took over the plant and business of Reading (Pa.) Abattoir Co. W. N. Witt, general manager for Armour at Milwaukee, will be general manager at Reading. Armour also plans a distribution center at Williamsport, Pa.

» CONTINENTAL BAKING Co. contemplates construction of a $225,000 distributing plant at Little Rock, Ark.

» COTTON BROS. BAKING Co. will erect a $100,000 plant at Jackson, Miss.

» CUDAHY PACKING Co. is spending $60,000 to improve its facilities at Albany, Ga., where it recently opened a new $500,000 plant. Cudahy has taken over a building at Harrison, Ark., and will install equipment for making cheese. And the company will construct a large addition to its Los Angeles plant this spring, this expansion being prompted by the growing Pacific-Southwest market.

» GREEN SPRING DAIRY is spending $300,000 on a plant at Baltimore.

» H. J. HEINZ Co. plans to construct at Fremont, Ohio, a tomato-products cannery.

» HYGRADE FOOD PRODUCTS CORP., New York, has purchased Cleveland (Ohio) Provision Co. for $400,000.

» LOUDON PACKING Co., Evansville, Ind., will establish a $150,000 plant at Lockport, N. Y.

» CARL MARTY Co., Monroe, Wis., large manufacturer of Swiss cheese, is converting the byproduct whey to powder to be mixed with animal rations and dog foods.

» PILLSBURY Co. is making a $1,000,000 addition to its large plant at Springfield, Ill. A nine-story mill and two warehouses will be constructed.

» RIECK-MCJUNKIN DAIRY Co. will improve its plant at New Castle, Pa., at a cost of $40,000.

» SCHUTTER-JOHNSON CANDY CORP., Chicago, has changed its name to Schutter Candy Co.

» SMITH CANNING Co. is constructa $50,000 pea cannery and a $20,000 warehouse at Pendleton, Ore.

» SQUIRE DINGEE Co. has taken over the Columbia (Miss.) salting station formerly owned by Budlong Pickle Co., Chicago.

L. J. SCHUMAKER

He succeeds Henry Stude as president of American Bakers' Association. He also is chairman of the association, but that office is now combined with the presidency. Mr. Schumaker is head of American Cone & Pretzel Co., Philadelphia.

RALPH O. DULANY

Elected president of National Canners' Association at the recent convention in Chicago, he will direct the activities of the largest group of food processors in the United States. Mr. Dulany is a canning-plant executive at Fruitland, Md.

» SCHWEITZER & Co., subsidiary of H. Moffatt Co., has moved into the most modern meat storage and distribution plant on the Pacific Coast, the new headquarters being in San Francisco.

» SWIFT & Co. will consolidate three Southern California plants into one large plant at Vernon. New buildings will cost more than $500,000. Swift will offer to employees, shareholders, customers and friends 250,000 shares of $25 par value capital stock.

» WASHINGTON GOAT ASSOCIATION plans to establish a cooperative goat cheese plant.

Personnel

» S. E. ABRAMS, Schlitz Brewing Co., Milwaukee, again heads up Wisconsin State Brewers' Association.

» B. F. ANDERSON, Council Bluffs, recently was reelected president of Nebraska-Iowa Cooperative Milk Association.

» WILLIAM BREI has been elected president of Platteville (Wis.) Brewing Co.

» JAMES BROOKS is now coating representative in metropolitan New York for Rockwood & Co., Brooklyn. Formerly plant superintendent, Mr. Brooks has been with Rockwood for 32 years.

» GEORGE C. COLEMAN has been selected to head up Virginia Dairy Products Association. He is connected with Birtcherds Dairy, Norfolk.

» JAMES F. CYPHERS was advanced on Feb. 1 from production manager to plant manager of Rockwood & Co., Brooklyn, N. Y. George Scheu was promoted from assistant engineer to plant superintendent, and Arthur Coutts, Louis De Russo and Peter Cantaloupo from foremen to assistant superintendents.

» ALEX E. ETTING, David City, is the new president of Nebraska Millers' Association.

» C. D. FARQUHAR, Sumner, Wash., has resigned as manager of Washington Packers, Inc., to enter the cold-pack business for himself.

» MRS. LOUIS GALLIKER has been named president of Galliker Ice Cream Co., Johnstown, Pa., to succeed her late husband.

» R. HENEGAR has gone with Maola Ice Cream Co., New Bern, N. C., as production manager of the milk and ice cream departments.

» HARRY F. JONES, advertising manager of Campbell Soup Co., Camden, N. J., has been elected a director of the company.

» FRANK A. JUGLER, president of Utah Fish Canning Co., Ogden, has been made president of Utah Canners' Association.

» OTTO KNAUSS has been made a vice-president and general sales manager of Igleheart Bros., Inc., Evansville, Ind. He had been sales manager.

» E. S. LAFRANCE heads up National Pickle Packers' Association for the coming year.

» ROBERT A. LEWIS heads up the Tea Association of the United States. He is with Standard Brands, Inc., New York.

» C. A. MESINER, Wittenberg, has been reelected president of Wisconsin Bottlers of Carbonated Beverages.

» NORMAN H. MAYO, General Ice Cream Co., Providence, R. I., recently was elected president of New England Association of Ice Cream Manufacturers.

» C. B. PAPE, formerly in the products department of California Prune and Apricot Growers' Association, San Jose, has gone with Reynolds Metals Co., New York, and will do research and promotion work on packages.

» J. W. POST, Armour & Co., has been appointed to the cream quality committee of the American Association of Creamery Butter Manufacturers, and M. E. Parker, Beatrice Creamery Co., has been named chairman of the research committee.

» JOHN H. STIFFLER has been elected president of Pennsylvania Milk Dealers' Association. He is general manager of Galliker Ice Cream Co., Johnstown.

» FRANK TIGHE has been named comptroller of G. Heileman Brewing Co., La Crosse, Wis., succeeding L. C. Holm, resigned.

» L. H. WILSON, formerly president of Golden State Co., Ltd., San Francisco, will go with General Milk Co., New York.

Deaths

» SAMUEL A. ARNOLD, 86, owner of Arnold Milling Co., New Lexington, Ohio, Feb. 14. He had operated the same mill for 67 years.

» CLINTON A. COCHRAN, owner of Marion (Ohio) Baking Co., Jan. 15.

» WILLIAM A. DAWSON, 68, president of Layton Packing Co., Milwaukee, from 1913 until 1935, Feb. 8.

» JOSEPH T. FISCHER, 60, president of Fischer Home Baking Co., Milwaukee, from 1901 to 1934, Jan. 29.

» HUGH M. FREER, 68, vice-president of Standard Brands, Inc., New York, in charge of traffic, purchasing, equipment, real estate and construction, recently. He had been with the company for 30 years.

» MARK E. FONTANA, president of Fontana Food Products Co., San Francisco, Feb. 9. He was aboard the airliner which plunged into San Francisco Bay.

» JACOB FUHREMANN, SR., 76, president of the Appleton, Wis., canning company bearing his name, Jan. 16.

» DEWEY V. HALES, 56, president and founder of Hales Milling Co., Milwaukee, Jan. 23. He organized the milling concern in 1911.

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SACCHARIN ... The Ideal Sweetener
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» JOHN HALLERMEIER, 73, president of the Elizabeth, N. J., dairy company bearing his name, Feb. 7.

» HUGH HUMPHREYS, 61, founder of Humphreys-Godwin Co., Memphis, and for 40 years a prominent figure in the cottonseed industry, Feb. 11.

» CHARLES E. HERLIHY, 61, general manager of Herlihy Bros. Inc., Boston, recently. He entered the dairy industry in 1894.

» JOHN H. HOLMAN, 79, founder of Bonita Candy Co., at Fond du Lac, Wis., recently.

» AUGUST MERCKENS, SR., 72, president and general manager of Merckens Chocolate Co., Inc., Buffalo, Feb. 3. Mr. Merckens founded the Buffalo company in 1921 and had been in the chocolate business for almost 50 years.

» TIACHIRO MORINAGA, 72, Japan's most important candy manufacturer, Jan. 25, at Tokyo.

» PAUL F. PRITCHARD, 61, founder of Pritchard Rice Milling Co., Houston, Texas. He was a past president of Rice Millers of America.

» FREDERICK W. RUECKHEIM, JR., 63, president of Cracker Jack Co., Chicago, recently. He had spent nearly half a century in the confectionery industry.

» GORDON STEWART, 51, president of Park & Tilford Candy Co., New York, Jan. 27. He was at one time with Lowney.

» FRANK J. STULL, 63, manager of the Buffalo plant of Francis Perot Sons Malting Co. for 28 years, Jan. 21.

» LESLIE R. VEATCH, 60, milling engineer at Buffalo, Feb. 10.

Associated Industries

» AMERICAN FOUNDRY EQUIPMENT Co., Mishawaka, has appointed Leslie L. Andrus general sales manager.

» DAIRY & ICE CREAM MACHINERY & SUPPLIES ASSOCIATION, New York, has elected H. S. Calvert, Pfaudler Co., president.

» FRICK Co., Waynesboro, Pa., has elected W. H. Aubrey as vice-president.

» INTERNATIONAL HARVESTER Co., Chicago, has appointed J. L. McCaffrey director of domestic and Canadian sales; W. F. McAfee, manager of domestic sales; and P. V. Moulder, manager of domestic motor-truck sales.

» LINCOLN ELECTRIC Co., Cleveland, announces the appointment of B. J. Brugge to the sales staff of its Los Angeles office.

» LINK-BELT Co., Chicago, has appointed Erwin A. Wendell district sales manager at St. Louis.

» ARTHUR D. LITTLE, INC., Cambridge, Mass., is now represented in the New York area by Julian M. Avrey.

» MINNEAPOLIS - HONEYWELL REGULATOR Co., Minneapolis, has entered into an agreement for the acquisition of the complete line of pneumatic controls manufactured by National Regulator Co., Chicago.

» MONSANTO CHEMICAL Co., St. Louis, has appointed A. T. Loeffler assistant manager of the Eastern district office at New York.

» OIL FIRES, INC., has increased its manufacturing facilities by merging with Lancaster Iron Works, Inc., and its activities will be conducted under the name of the latter concern, which has plants at Lancaster, Pa.

» PERMUTIT Co., New York, has named Daniel J. Saunders manager of industrial sales.

No Wonder

THE INDUSTRIAL KEMP CARBURETOR

chefs are proud of their handiwork. All we need to do at Kemp to feel the ruddy glow of pride coursing through our veins (and arteries too of course) is to roll some delicious Beech-Nut Product under an enchanted tongue and reflect . . . the Kemp Industrial Carburetor and Kemp burner equipment played their small part in the plant where these are made.

You see, the Beech-Nut people think they can handle certain heating operations* better with Kemp equipment than in any other way . . . and they ought to know.

So it might be that Kemp Equipment would roast nuts for you very nicely too, or bake bread or cook candy or brown your cereal . . . and with profound respect for your pocket book. Who knows?

We don't know, and you don't know. But we can find out, gladly . . . if you'll just ask. Address the **C. M. Kemp Mfg. Co., 405 E. Oliver Street, Baltimore, Md.**

*For Beech-Nut, Kemp roasts peanuts and drys printing ink for those attractive labels.

KEMP of BALTIMORE

A Wholesaler Became Efficient

(*Continued from page* 123)

lengthwise in the middle of the truck. This was to enable the checker to check the bill without removing any merchandise from the selection truck before actual loading was done. These selection trucks had special writing boards to which the bill was clipped. This feature did away with the old custom of the warehousemen carrying the bill and having to lay it down every time a piece of merchandise was to be selected.

After the selection of each bill, never more than one to a selection truck, the truck was placed in a stall on the loading platform. When the complete load was assembled there, or even before the whole load had been worked, it was loaded directly from the selection truck onto the delivery truck. This eliminated the waste motions made when the merchandise is first unloaded from the hand truck onto the floor for checking, and then onto the waiting truck. We used the semi-trailer type of delivery truck, having four trailers and three tractors. This enabled all the tractors to be used at the same time that the fourth trailer was being loaded, and kept all the drivers and loaders busy, whether loading a truck or making deliveries, doing away with the old inefficient and wasteful trouble of having too much work one minute and not enough the next.

A year after this system had gone into effect, and was really running efficiently, quite amazing results were shown. Before installing the systems, there were ten warehousemen and eight persons in the office, not including a buyer and the executives. One year later, there were five warehousemen and four of the office help left. The business had increased almost $300,000 over the previous year, the cost of operating had decreased 4 per cent and the net had risen from a deficit of $20,000 to a profit of $22,000. The inventory investment had been reduced by $40,000 and the accounts receivable also had been cut by almost $40,000. There were no problems of "out of stock" items, nor did buying involve anything more than ordering the correct amounts automatically shown by the records after the prices had been determined by conference with manufacturers' representatives. Control inventories were handed to the buyer each Saturday morning showing him the actual inventory and weekly movement of every item.

Warehousemen were selecting, on the average, 100 pieces an hour where they had been selecting only 30 pieces. The billing office was handled by two people, and was turning out their bills much faster and more correctly than under the old methods. Price errors were eliminated.

Salesmen were opening up new territories previously inaccessible because of the scarcity of time. Customers' service was speeded up to an almost unbelievable point of perfection. The salesmen were being rewarded for their efforts and sales kept on mounting. No long struggles were necessary to get the accounts receivable statements out on the first of the month. Control had taken the place of the hit-and-miss methods of old, and the firm's balance sheet told the story of what modern methods and proper control will do.

WHY LO-BAX IS A DEPENDABLE STERILIZER

FOR sterilizing surfaces with which milk and other dairy products come in contact, you require a dependable, quick-acting bactericide. Your bactericide must also, of course, be safe, convenient and low in cost.

How does Lo-Bax meet *all* these vital requirements?

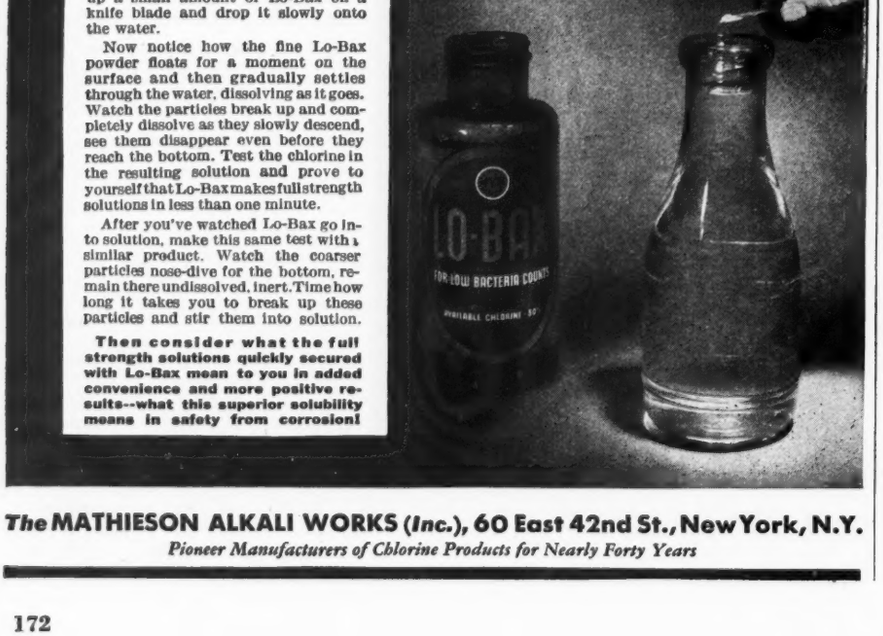
In the first place, extremely low alkalinity and high chlorine "availability" make Lo-Bax unique among sterilizers for speed and dependability in killing bacteria. The quick solubility of Lo-Bax, moreover, renders positive results doubly sure.

For at the end of only one minute, Lo-Bax solutions are up to full strength and ready for use. There are no undissolved particles of concentrated material to cause corrosion.

Lo-Bax is easy to use—just add it to hot or cold water by the spoonful as needed. Lo-Bax is low in cost—one bottle (1¾ lbs.) makes more than 1,000 gallons of clear, 100-p.p.m. dairy rinse solution.

Why not let Lo-Bax help you maintain low bacteria counts? Write for full information today.

Make This Test—Prove to yourself that Lo-Bax dissolves faster



Fill a milk bottle up to an inch from the top with ordinary tap water. Pick up a small amount of Lo-Bax on a knife blade and drop it slowly onto the water.

Now notice how the fine Lo-Bax powder floats for a moment on the surface and then gradually settles through the water, dissolving as it goes. Watch the particles break up and completely dissolve as they slowly descend, see them disappear even before they reach the bottom. Test the chlorine in the resulting solution and prove to yourself that Lo-Bax makes full strength solutions in less than one minute.

After you've watched Lo-Bax go into solution, make this same test with a similar product. Watch the coarser particles nose-dive for the bottom, remain there undissolved, inert. Time how long it takes you to break up these particles and stir them into solution.

Then consider what the full strength solutions quickly secured with Lo-Bax mean to you in added convenience and more positive results--what this superior solubility means in safety from corrosion!

The MATHIESON ALKALI WORKS (*Inc.*), 60 East 42nd St., New York, N.Y.

Pioneer Manufacturers of Chlorine Products for Nearly Forty Years

Heat Treatment of Milk

(*Continued from page* 133)

the increased activity is probably due to the minerals contributed by the milk. But experimental work has indicated that whereas the diastases are made less active by the change in hydrogen-ion concentration of the dough system through the use of milk solids, the reverse is the effect upon the zymases.

How can the baker make use of these facts? He can insist on using milk solids which are properly prepared and give the maximum desirable effect on bread quality. He can test his milk by the method previously described in this article to determine whether he is getting such quality. In mixing doughs containing milk solids, it is well to recognize the slowness of true dough formation, to avoid excessively high speeds in mixing and to have doughs slacker than usual as they come from the mixer.

If doughs seem dead the condition may be due to improper gas retention caused by a poor milk or to improper dough condition. If sponges or straight doughs have such properties when milk is used the condition may be due to a slowing up of diastatic activity that is best corrected by the addition of malt. When doughs are properly prepared from good ingredients and enough fermentable sugar is present, milk solids will add life to fermentation because of an activation of gas-producing enzymes.

Insect Infestation . . .

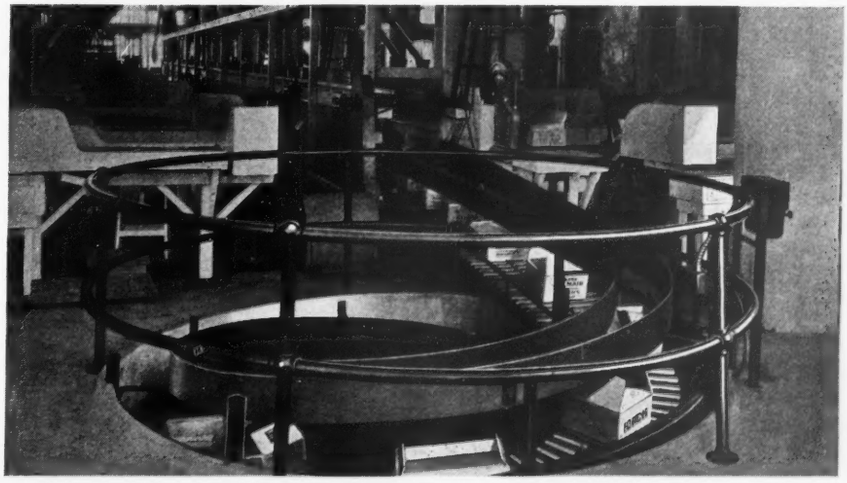
(*Continued from page* 143)

than is moist hot air at 75 per cent relative humidity. Hot air with 100 per cent relative humidity appears to be most effective. 4. Exposure to high temperatures produces varying degrees of sterility in female beetles depending upon the temperature and the length of exposure. Injury to fertility of the females was greater at dry heat than at 75 per cent relative humidity. 5. Males recover from treatment exposures sooner and more completely than do the females.

An important factor in the effectiveness of the heat treatment for stored flour is the rate at which the heat penetrates the flour to bring it to the temperature of the room. The time interval is much longer than an inexperienced person would suspect. Two factors are involved: the temperature of the room and the original temperature of the flour. The accompanying curve shows the rise in temperature of 4 in. of flour in a quart glass jar suspended in a water bath heated gradually from about 20 deg. C. (68 deg. F.) to 51 deg. C. (124 deg. F.). It is estimated that at least four days of continuous exposure to 130 to 140 deg. F. temperatures are necessary to heat through a bag of flour. It is important that this factor be taken into account. Flour stored in a mill which is being given a heat treatment will serve as a refuge for the insects in that portion of the mill until the flour reaches a killing temperature.

Advocates of the heat treatment method claim that one treatment per year is sufficient to keep a mill free from insect pests and that the cost after the heating system is installed is less than one-fifth that of gas fumigation. As early as 1910 and 1911 heat treatment was used in several mills in Kansas, Ohio, Iowa, Illinois and Canada. Since then it is being used more and more widely in flour mills throughout the country.

APPLY THE LAW



of Continuous Flow

CONTINUOUS flow in production has the force of natural law. Every production process, every type of machine used in production has a natural course of evolution toward the principle of continuous flow.

Batch and intermittent methods are doomed. In the packaged food industries this has long been apparent. But even in many plants using modern machines and processes, individual operations are not fully integrated and unified so that the plant can operate at its highest over-all efficiency.

Mathews engineers, trained for over 32 years to think of production as one continuous process, often bring about astonishing lowering of cost and increase of output by applying this principle where it has been overlooked, and by relatively small additions to present equipment.

Ask for a survey by a competent Mathews engineer.

"Problems Solved with Mathews Conveyer Systems" is a book which illustrates many typical examples of the Continuous Flow Principle. Write for it today.

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CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

CONVEYERS

BOOKS RECEIVED

ANNUAL REVIEW OF BIOCHEMISTRY, VOL. V. Edited by James Murray Luck, Stanford University. Published by Annual Review of Biochemistry, Ltd., Stanford University, Calif. 1936. 640 pp., 6½x9 in.; cloth. Price, $5.

Object of these reviews is to shorten the work of research workers and technologists in their efforts to keep up with literature on the subjects in which they are interested. Each volume covers current development in 25 or 30 major fields of interest in biochemistry.

In this volume are chapters of interest to food workers on enzymes, carbohydrates and glucosides, proteins and amino acids, fats and oils, water-soluble and fat-soluble vitamins, and molds.

METHODS OF ANALYSIS, 4TH EDITION, 1935. Published by Association of Official Agricultural Chemists, 540 Benjamin Franklin Station, Washington, D. C. 1936. 730 pp., 6½x9½ in.; cloth. Price, $5.

Every five years the A.O.A.C. brings this important guide up-to-date through revisions which keep the analysis of foods and food materials in step with latest developments in technical knowledge for the enforcement of federal and state food laws.

Only those methods which receive official or tentative recognition after a great amount of collaborative research work are given. This precautionary practice gives these methods high value for referee work to clear up disputes or discrepancies arising between control and research laboratories in the commercial field over contract specifications as well as between commercial and governmental laboratories over compliance with Federal Food Administration regulations.

No laboratory dealing with food products or materials should be without a copy of the latest edition. Changes made in the contents of the third edition are too numerous to mention in a short review of this edition.

THE SOY BEAN. By L. B. Breedlove. Published by Journal of Commerce Publishing Co., 12 East Grand St., Chicago, Ill. 1936. 16 pp., 11½x17¼ in.; paper. Price, 50 cents.

As a series of twenty articles this treatise was first published in the *Chicago Journal of Commerce* during the past year. The completeness with which the author has covered the subject from an industrial and economic view makes this reprint worth having by any manufacturer using cereals or legumes as a raw material.

FLAVORS AND ESSENCES. By M. H. Gazan. Published by D. Van Nostrand Co., Inc., 250 Fourth Ave., New York, N. Y. 1936. 115+VIII pp., 5¾x8⅞ in. Flexible cloth. Price $10.00.

In the author's preface this compilation is defined as a new type of formulary. It is a new type in that it gives very little information other than the identity and proportions of the essential oils, spices, aromatic chemicals, and colors necessary to produce each of more than 300 fruit and other types of flavoring essences and mixtures used in foods and beverages.

An 18-page illustrated appendix contains the only text or explanatory material in the book.

PATENTS

Dextrose Crystalized From Starch Converted Solutions in Continuous Manner—Charles Ebert, Leonia, N. J. and William B. Newkirk, Western Springs, Ill. to International Patents Development Co., Wilmington, Del. No. 2,065,669. Dec. 29, 1936.

Shortening in Dry, Powdered, Finely-Divided Form Made From Liquid Milk and Hydrogenated Oil—Elmer J. Fechner to the Page Milk Co., Shelbyville, Ind. Nos. 2,065,675 and No. 2,065,276. Dec. 29, 1936.

Dextrose of High Purity Crystallized Under Vacuum From a Starch Converted Dextrose Solution—William B. Newkirk, Western Springs, Ill. to the International Patents Development Co., Wilmington, Del. No. 2,065,724. Dec. 29, 1936.

Lactose Used as Ingredient in Preparation of a Dried Product Made by Grinding and Drying Fresh Vegetables—Gerhard Madaus, Dresden, Germany to Dr. Madaus & Co., Radebeul-Dresden, Germany. No. 2,065,863. Dec. 29, 1936.

Sugar Liquors Obtained Through Conversion of Corn Starch Clarified by Filtration Through Cloth Upon Which Has Been Formed a Layer of Solids Contained in Slops From Starch-Making Process—Charles J. Copeland, North Kansas City, Mo. to International Patents Development Co., Wilmington, Del. No. 2,066,141. Dec. 29, 1936.

Fruit Concentrates Prepared by Adding Sugar to Fruit, Subjecting Mixture to Air Pressure in Closed Container and Finally Concentrating Under Reduced Pressures at Relatively Low Temperatures—Bruno P. Pilorz and Bernard J. Butler, Honolulu, T. H. to California Packing Corp., San Francisco, Calif. No. 2,066,574. Jan. 5, 1937.

Dusting Flour Automatically Released in Dough Break as Passage of Dough Actuates Electrically Controlled Release Device—Edward T. Parsons, Upper Montclair, N. J. to Thompson Machine Co., Belleville, N. J. No. 2,066,899. Jan. 5, 1937.

Distillers' Spent Wash, Steep Water and Press Water of Starch Factories and Acid-Containing Vegetable Extracts Concentrated for Use in Fermentation—Alfred Pollak, Woodmere, N. Y. No. 2,067,002. Jan. 5, 1937.

Confectionery Deposited Under Pressure Through a Plurality of Die Heads so Arranged That Confectionery Pieces May be Built up in Layers—James E. Mayhew, Upper Darby, Pa. No. 2,067,200. Jan. 12, 1937.

Dried Whole Milk Made Resistant to Deterioration by Method Which Includes Deoxidation of the Liquid Milk, Inclusion of Inert Non-Oxidizing Gas, Chilling, Homogenization, and Preheating Prior to Drying—Floyd W. Robison and Godfrey D. Elmer, Detroit, Mich. No. 2,067,205. Jan. 12, 1937. 1937.

Sugar Solutions Given a First Step in Carbonating of Limed Solution in Presence of an Ammonium Salt at a Temperature Below 85 Deg. C. Under a Controlled Hydrogen-Ion Concentration—George E. G. von Stietz, Berkeley, Calif. to Shell Development Co., San Francisco, Calif. No. 2,067,362. Jan. 12, 1937.

Casein Dried in a Continuous Manner Under Influence of Heated Air Under Pressure—Frank V. Silva, Turlock, Calif. No. 2,067,506. Jan. 12, 1937.

Deep-Fat Cooked Foods Given Cheese Coating by Having a Layer of Melted Cheese on Surface of Cooking Fat—Ruben Romney, Jr. to Cheezits Corp., Salt Lake City, Utah. No. 2,067,682. Jan. 12, 1937.

Ice Cream Frozen in a Continuous Manner in System in Which Mix is Pumped Continuously From Supply Source Through Mixer to be Discharged in Frozen State at Outlet—Almond C. Routh, Sandusky, Ohio. No. 2,067,683. Jan. 12, 1937.

Yeast Fermentation Aided by Addition of Carbamid, Urease and an Oxidizing Agent to Leavened Bread Dough—Albert K. Epstein and Benjamin R. Harris, Chicago, Ill. to Standard Brands, Inc., New York, N. Y. No. 2,067,908. Jan. 19, 1937.

Crust Color of Bread Improved by Addition of Small Quantity of Urea, Urease, Mucic Acid and Calcium Acid Phosphate to Doughs—Charles N. Frey, Alfred S. Schultz, and Elmer B. Brown, New York, N. Y. to Standard Brands, Inc., Dover, Del. No. 2,067,911. Jan. 19, 1937.

Bread Improved Through the Addition of an Amid, Soya Flour, a Calcium Sulphate, and Potassium Bromate to Other Dough Ingredients—Charles N. Frey and Alfred Schultz, to Standard Brands, Inc., New York, N. Y. No. 2,067,912. Jan. 19, 1937.

Licorice Concentrate Dried and Molded Under Pressure—William L. Geddes, Sussex, N. Y. to MacAndrews and Forbes Co., Camden, N. J. No. 2,067,913. Jan. 19, 1937.

Sterilized Canned Nut Spread Made From Finely Divided Nutmeats, Sweet Cream and Crystallized Arrowroot Starch—Tracy M. Canton and Wilbur B. Tucker, Grand Rapids, Mich. to Nunut Foods, Inc., Plainwell, Mich. No. 2,068,051. Jan. 19, 1937.

Alimentary Dough Ingredients Mixed, Kneaded and Extruded Through Die in a Continuous Manner—August Baechi, Niederuzwil, Switzerland, to Gebrüder Bühler, Uzwil, Switzerland, No. 2,068,220. Jan. 19, 1937.

Strips of Pretzel Dough Twisted into Pretzel Form by a Mechanical Means—Carlton L. Hoff, York, Pa. to National Biscuit Co., New York, N. Y. No. 2,068,234. Jan. 19, 1937.

Concentrated Corn Steep Water Added to Beer Wort After Fermentation and Before Filtering—Howard File, Decatur, Ill. to A. E. Staley Mfg. Co., Decatur, Ill. No. 2,068,738. Jan. 26, 1937.

Partially Cooked Oatmeal Porridge Canned and Heated to not Exceed 230 Deg. F. to Complete Cooking—Elizabeth C. Forbes, Fallston, Md. No. 2,068,910. Jan. 26, 1937.

Sugar Syrup Containing at least 65 Per Cent Sugar Solids Made Non-crystallizing by Increasing Levulose Content Through Removal of Crystallized Dextrose Content—Herbert C. Gore, and Charles N. Frey, Scarsdale, N. Y. to Standard Brands, Inc., New York, N. Y. No. 2,069,064. Jan. 26, 1937.

"Non-Break" Soya Oil Made From "Break" Soya Oil With Recovery of Lecithin—Henry R. Kraybill, Lafayette, Ind., to Purdue Research Foundation, West Lafayette, Ind. No. 2,069,187. Jan. 26, 1937.

Refined Glyceride Given Anti-rancidity Properties Through Preparation from an Oil Containing a Seed Infusion with Anti-Rancidity Constituents—Sidney Musher, to Musher Foundation, Inc., New York, N. Y. No. 2,069,265. Feb. 2, 1937.

Vegetable Coloring Matter and Vitamin Ingredients Extracted From Fresh Vegetables by a Liquid Containing Milk Sugar and Put Into Dried State By Spray Drying—David D. Peebles, Eureka, Calif. No. 2,069,388. Feb. 2, 1937.